Measures of Business Efficiency

By

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EDITORIAL DEPARTMENT NOTE

Before the results achieved in any undertaking can be known and evaluated, a yard stick or other unit must be found in terms of which to measure the achievement. In the management and proper control of any business concern, the record of achievement in terms of the unit of measure adopted, of necessity plays a most important role. While the adoption of a unit of measure is a necessary prerequisite to such control, an even more important element is the setting of a standard by means of which to rate or evaluate the results actually attained. In the setting of a standard, the results attained in previous years will be an important consideration. Hence, the method of comparison is brought into use. The necessity, therefor, of adopting units of measurement which will from year to year and under varying conditions make a true record of results achieved and which will thus be comparable must be apparent.

That executives are striving more and more to secure a true record of results which can be used as a measure of achievement, is an indication of the constantly increasing desire and effort to put the management of business on a scientific basis. The interest of our Chapters in this matter is a further indication of this fact. The present publication deals with this broad subject of "measures" and comprises a paper delivered before a recent meeting of the Boston Chapter.

Mr. Clyde Morgan, the author, was graduated from the College of Liberal Arts of Boston University in 1912. His early experience was with the New England Telephone and Telegraph Company, in the Statistical Department. He then became Assistant Treasurer of the Gamewell Fire Alarm Company, after which he was for eighteen months in public accounting practice. At the present time, he is Treasurer and a Director of the S. D. Warren Company, paper manufacturers and also president and director of Chandler & Farquhar Company, hardware dealers.

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MEASURES OF BUSINESS EFFICIENCY

PRESIDENT Lowell, of Harvard, in a recent report to the Overseers of the University said, "Much of the evil in the world comes from errors in ideas, from a simple failure to think clearly and to grasp the essential, as distinguished from the superficial, elements in a situation. We are apt to form a habit without considering whither it leads; or, to have a dim idea of an object, adopt a means of reaching it, forget the object, and develop the means until they are quite inconsistent with the object to be attained."

The fact that President Lowell was speaking of athletics, and more particularly of football, does not make the statement less striking or less to the point. The statement applies as forcefully to business and business men in general, so I like to get back to the fundamentals of existence now and then, and thus, in some measure, counteract this tendency "to develop the means until they are quite inconsistent with the objects to be attained." Now and then I like to read over the Declaration of Independence, and again try to realize that in the final analysis our personal lives are builded on the principles set forth in this document.

Getting down to a consideration of business, I look for some document embodying the fundamental laws and principles upon which business life is built. Unfortunately, the search is more difficult. Why this should be true, concerning such an important feature of human existence, I do not know.

Why are we in business? What are the principles upon which industry should be built? The late Judge Parker, once Democratic candidate for the Presidency of the United States, and always one of the eminent jurists of the age, has given us the most comprehensive and satisfactory statement of the fundamental "Principles of Business Conduct." Space here will not permit me to give in full his remarkable document, written for, and published by, the Chamber of Commerce of the United States. I recommend that everyone secure a copy of this little booklet and read it, for it is well worth while. I can give now merely the fifteen "Principles of Business Conduct," set forth in a resolution passed by that body at the Twelfth Annual Meeting at Cleveland, Ohio, on May 8, 1924.

Principles of Business Conduct

Preamble. "The function of business is to provide for the material needs of mankind and to increase the wealth of the world and the value and happiness of life. In order to perform its function it must offer a sufficient opportunity for gain to compensate individuals who assume its risks, but the motives which lead individuals to engage in business are not to be confused with the function of business itself. When business enterprise is successfully carried on, with constant and efficient endeavor to reduce the cost of production and distribution, to improve the quality of its products, and to give fair treatment to customers, capital, management, and labor, it renders public service of the highest value.

"We believe the expression of principles drawn from these fundamental truths will furnish practical guides for the conduct of business as a whole and for each individual enterprise."

Principle I. THE FOUNDATION of business is confidence, which springs from integrity, fair dealing, efficient service, and mutual benefit.

Principle II. THE REWARD of business for service rendered is a fair profit plus a safe reserve, commensurate with risks involved and foresight exercised.

Principle III. EQUITABLE CONSIDERATION is due in business, alike to capital, management, employees, and the public.

Principle IV. KNOWLEDGE—thorough and specific—and unceasing study of the facts and forces affecting a business enterprise, are essential to a lasting individual success and to efficient service to the public.

Principle V. PERMANENCY and continuity of service are basic aims of business, that knowledge gained may be fully utilized, confidence established and efficiency increased.

Principle VI. OBLIGATIONS to itself and society prompt business unceasingly to strive toward continuity of operation—bettering conditions of employment and increasing the efficiency and opportunities of individual employees.

Principle VII. CONTRACTS and undertakings, written or oral, are to be performed in letter and in spirit. Changed conditions do not justify their cancellation without mutual consent.

Principle VIII. REPRESENTATION of goods and services should be truthfully made and scrupulously fulfilled.

Principle IX. WASTE in any form—of capital, labor, ser-

vices, materials, or natural resources—is intolerable, and constant effort will be made toward its elimination.

Principle X. EXCESSES of every nature—inflation of credit, over-expansion, over-buying, over-stimulation of sales—which create artificial conditions and produce crises and depressions are condemned.

Principle XI. UNFAIR COMPETITION, embracing all acts characterized by bad faith, deception, fraud, or oppression—including commercial bribery—is wasteful and a public wrong. Business will rely for its success on the excellence of its own service.

Principle XII. CONTROVERSIES will, where possible, be adjusted by voluntary agreement or impartial arbitration.

Principle XIII. CORPORATE FORMS do not absolve from, or alter, the moral obligations of individuals. Responsibilities will be as courageously and conscientiously discharged by those acting in representative capacities, as when acting for themselves.

Principle XIV. LAWFUL COOPERATION among business men, and in useful business organizations in support of these principles of business conduct, is commended.

Principle XV. BUSINESS should render restrictive legislation unnecessary, through so conducting itself, as to deserve and inspire public confidence.

These, I believe, embody the fundamentals upon which business is built. It is safe to say that the acceptance and practical application of these principles in every business will lead to success; or, conversely, the violation of these principles will lead to failure.

That this is true is easily demonstrated. How many businesses in the United States are successful? The latest available figures (from the December 11th issue of Sales Management) show some rather astonishing facts. An analysis of 414,421 firms brings out the fact that but 236,389, or 56.6%, made any profit at all in 1924; and 178,032, or 43.4%, showed a deficit.

Merely incidentally, in certain industries the percentages are appalling. Only 35% of the Cotton Manufacturers made a profit, 65% showing a deficit. But 35.8% of Auto Tire and Inner Tube Manufacturers showed a profit, 64.2% showing a deficit.

From another angle: The Bureau of Business Standards of the Shaw Publications recently published a report which indicates an astonishing condition of affairs. The general average of life for manufacturing concerns in the United States is but seven years. It is pointed out that the average Wholesale Grocery House, the

average Iron Works, and the average Jewelry Store have but five chances out of ten to live fifteen years. The average Wholesale Meat Business and the average Book and Stationery Store have less than two chances out of ten to live fifteen years. The average Furniture Factory, the average Clothing Store, and the average Wholesale Lumber Business have only about one even chance out of ten to live ten years. Several thousand concerns are represented by these figures. They all died before they were thirty years of age. What fundamental laws were violated to bring these businesses prematurely to their graves?

An analysis of several thousand of these business failures, made by the same organization and taken from their report is as follows:

The Causes of Business Deaths

From a Study of 2,550 Retail Stores:

Failure to take a legitimate profit
Increasing cost of doing business
Ignorance of overhead expense
Bad accounting and poor collections
Overbuying
Cut-rate competition
Lack of capital
Poor location
Undue eagerness to make a big splurge
Failure to take a "census" of the local market
Poor stocks
Failure to create a store personality
Poor equipment and fixtures
Unsupported advertising

An Analysis of Deaths Among 492 Wholesale Concerns:

Handling inadequately advertised lines
Failure to advertise
Overbuying
Lack of supply for private brands
Indiscriminate extension of credit
Failure to foresee changes in style
Poor collection methods
Unwillingness to help the retailer

The Result of a Study of 1,327 Manufacturing Concerns

Neglect of established line
Unwise experimentation

Exorbitant overhead expense
Diffused attention
Overproduction
Poor design
Lack of capital
Antiquated equipment
Overlooking new demands
Bad buying
Too much waste and spoilage
Trying to change market to fit product, rather than product to fit market
Inadequate selling methods

Bearing in mind the before-mentioned "diseases," examine Bradstreet's analysis along similar lines:

Analysis of Business Deaths:

	Number	
	1924	1923
Lack of Capital	6,573	6,563
Incompetence	6,778	6,448
Inexperience	927	902
Unwise credits	211	223
Failures of others	305	297
Extravagance	307	259
Neglect	254	231
Competition	381	262
Specific conditions	3,130	3,116
Speculation	96	63
Fraud	750	796
Totals	19,712	19,159

Having in mind the Principles of Business Conduct which I read you, what does the autopsy show? Check these four sets of Business Diseases, and you will note that by far the greater percentage died of a malady which you gentlemen alone—you accountants—can cure.

From a study of 2,550 Retail Stores, with a total of fourteen causes of Business Deaths, eight can be attributed to "Lack of Knowledge."

From a study of 492 Wholesale Concerns, with a total of eight causes of Business Deaths, three can be attributed to "Lack of Knowledge."

From a study of 1,327 Manufacturing Concerns, with a total of thirteen causes of Business Deaths, nine can be attributed to "Lack of Knowledge."

From a study of 19,712 Business Deaths, by Bradstreet's with a total of eleven causes of Business Deaths, six can be attributed to "Lack of Knowledge."

Knowledge

"Knowledge, thorough and specific"—an unceasing study of the facts and forces affecting a business enterprise—are essential to a lasting individual success and to efficient service to the public.

After some seventeen years in various capacities, with varying sorts of businesses, I have come to the conclusion that violation of this Principle—that lack of knowledge, thorough and specific—is the greatest cause of business mortality. The violation of this Principle has caused more business deaths than any other single factor, so I would like to discuss briefly this Principle and its practical application to our businesses. I will not touch upon knowledge in the direction of merchandising or the technical branches of business. These are subjects to be discussed only by specialists in those particular branches, and I will give my attention to the accounting and financial aspects.

This Principle is well recognized and while everyone,—particularly in a gathering of this sort—will accept it as fundamental, it is difficult to interpret it in terms of everyday business. What is knowledge, thorough and specific? Does it mean the determination of Costs, Operating Expenses, Financial Standing, Net Worth, etc.? Does it mean the determination of the facts and figures having to do with a business or does it go farther than that?

It is the function of you gentlemen, in your respective organizations, to produce and present the vital statistics of your business. Statements for use in determining costs and operations are not difficult to produce. I will not try to enter into a technical discussion of cost accounting. I am not so vitally interested in the question of whether or not interest is properly included in manufacturing costs or in the various principles of expense distribution. The question of standard costs versus actual costs is of little moment. Accounting and statistical methods are becoming well recognized. Your Association, for instance, has done wonderfully fine work in developing satisfactory accounting procedure for the use of industry. Sometimes I fear that we, as accountants, are "adopting a means, forgetting the object, and developing the means until they are quite inconsistent with the object to be attained."

The statistics—the facts you produce—of themselves mean very little. The abstract facts stated in a Balance Sheet and Income Statement, a Cost Analysis, or a Sales Analysis, may be interesting of themselves, but they really mean nothing. The amount of Plant Investment, of Current Liabilities, of Gross Sales, of the Cost of Doing Business, Total Interest and Capital Charges, may be interesting of themselves, but unless we have some yardstick by which to measure them, unless we can find some measures of business efficiency with which to compare them, they are valueless.

As an illustration: A fruit man has twenty-five dollars of capital. He invests fifteen dollars in Plant, that is, a push cart. He invests ten dollars in Inventory, that is, he goes down to the fruit piers and buys bananas. He goes out through the city and sells his fruit in one day, for twenty-five dollars. There we have the facts of a business. There is nothing remarkable in that. If he so wished, he might make nicely typewriten reports, showing his Sales that day as compared with the same day last week, last month, and last year. He might chart his Sales by days, separately and cumulatively. He might analyze his Sales by streets; he might make comparative Balance Sheets and Profit and Loss Statements; he might even work out very complete Cost Analyses, showing how much it would cost to sell one banana, one dozen, a whole bunch, case lots, broker lots, etc. All these would be nothing but facts, however. Some day the fruit man's son may come home from college and show dad that there are certain relationships in his business which should not be overlooked. And he might point out that the Turnover of Capital Invested in Inventory was one Turnover a day—or, allowing for Sundays and holidays, 300 times per year; that his profits were 60% of gross sales; or his profits per year, 180 times his total investment. Of themselves these are interesting facts, but of themselves they mean nothing. As abstract figures they are ridiculously small. His gross sales of $7,500 per year, and his gross profits of $4,500 per year, were ample for his needs. To the company with which I am connected such figures would mean ruin. On the other hand, if in our business we could attain a Turnover of Inventory of 300 times per year, or even approach a Profit of 60% of Gross Sales—or, if we could come anywhere near making Profits 180 times our Total Capital Invested—we certainly would attract considerable attention in the paper industry, and in industry in general. Your figures may be reasonable and satisfactory to you, but they might spell ruin to the United States Steel

Corporation or the Ford Motor Company. The figures of themselves mean nothing, unless considered in their relation to the other financial and operating statistics of the particular unit of business and—what is of vitally more importance—in relation to the measures of efficiency as established in the rest of the industry, and in relation to the measures of efficiency established in other industries, as well.

So it is with business in general. Sometimes I feel that we accountants are very much like the little boy who went to kindergarten for the first time. When he got home, his mother asked him what he had learned. "Gee, Ma, we marched; and all the time we were marching I watched just myself; and, Ma, I'm the best marcher in the world!"

It is obvious that competition is the essence of all commercial organization. Competition is the force promoting efficiency, development, and industrial growth. This competitive condition in industry extends to every phase of its affairs. There is competition in merchandising, in factory operation, in distribution, and, though it is not as generally recognized, in financial management. Competitive conditions in industry have established standards in every detail of operation, which must be met if success is to be attained.

Standards and Measures

Everyone appreciates the existence of competitive standards in merchandising. Business men, as a general rule, must buy and sell at competitive prices. Exceptionally good merchandising may afford a somewhat better gross margin than the average. Efficient plant operation, quality product, good service, may yield some competitive advantages, but there are well-known and accepted standards to be met in every line. It is not as well recognized, but just as true, that in financial affairs there are definite standards set by competitive conditions. There is economy and efficiency in the use of capital, fully as important as economy and efficiency in operation. There is a normal or average turnover of inventories. There are recognized terms of sale which should be reflected in turnover of accounts receivable. There is an average, or normal, investment in fixed properties necessary for any given volume of business. As the cost of borrowed capital must come out of gross margin, the competitive standards for economy and efficiency in the use of borrowed capital must be observed, and met, if best returns upon net worth are to be realized. A slower-than-average turnover of

any kind, or unnecessary investments of any type, put competitive handicaps on the business, which affect return on capital just as failure to meet competitive conditions in merchandising or operation.

And there is nothing of greater importance in the management of any business than determination of the standards to be striven for, if the most advantageous showing is to be made. Ratios of Expenses, Earnings to Sales, and Ratios of Earnings on Capital Employed, are well-known and commonly used measures for judging business affairs; but these are only three of the relationships which should be considered. In the same class should be considered all of the other ratios, relationships, and turnovers, for they are all indicators of the conditions existing in a business. They are all expressions of relationships for which there are, or should be, recognized standards. They may be classified as follows:*

Measures of Earnings:

1. Relation of surplus net profits to net worth:
   Balance of Net Profits after Dividends, taxes, and other surplus charges ÷ Total Net Worth or Total Capital Invested.
2. Relation of surplus net profits to volume of business:
   Balance of Net Profits after Dividends, taxes, and other surplus charges ÷ Gross Sales.
3. Relation of earnings to Common Stockholders' Investment:
   Balance of Net Profits after Dividends on Preferred Stock, Taxes and other surplus charges ÷ Book Value of Common Stock.
4. Relation of operating profits to total capital used:
   Net Profits before Dividends and Taxes ÷ Total Net Worth.
5. Relation of operating profits to volume of business.
   Net Profits before Dividends and Taxes ÷ Gross Sales.
6. Relation of gross earnings to volume of business.
   Gross Profits ÷ Gross Sales.

Measures of costs and expenses:

1. Relation of costs and expenses to volume of business:
   a. Total Cost of Goods Sold ÷ Gross Sales.
   b. Total Expense of Doing Business ÷ Gross Sales.

* See Bliss: Financial and Operating Ratios in Management.

2. Relation of property expenses to investments and sales:
   a. Total Fixed Capital Expense ÷ Total Net Worth.
   b. Total Fixed Capital Expense ÷ Gross Sales.
3. Cost of borrowed capital.
4. Cost of total capital employed.

Turnovers:

1. Turnover of total capital employed:
   Gross Sales ÷ Total Net Worth.
2. Turnover of Inventory:
   Cost of Goods Sold ÷ Total Inventory.
3. Turnover of accounts receivable:
   Net Sales ÷ Accounts Receivable.
4. Turnover on fixed property investment:
   Gross Sales ÷ Total Fixed Assets.

Financial Relationships:

1. Working capital ratio:
   Current Assets ÷ Current Liabilities.
2. Manner in which capital is employed.
   % of total Net Worth in Working Capital, Fixed Assets, etc.
3. Sources from which capital is secured.
   % of total Net Worth in Preferred Stock, Common Stock, Surplus, etc.
4. Proportion of earnings left in the business.
   Net Profits after Taxes, Dividends, and other surplus charges ÷ Total Net Profits.

These relationships, or "Measures of Business Efficiency," are self-explanatory, so I will not weary you with discussion or definition. Such information may be secured from authoritative sources.

There is, however, one further step which we must consider before we can arrive at "knowledge, thorough and specific." We must ascertain the facts and relationships not only in our own businesses, and the facts and relationships in our specific industries, but we must ascertain besides, the facts and relationships in other industries.

Of what interest can the facts and relationships of other industries be to us in our respective industries? Of what importance can the facts and relationships of the Leather Industry be to those engaged in Cotton Cloth Manufacture? What possible connection

can the facts and relationships of the Paper Industry bear to the Meat Packing Industry?

I can assure you that study of the facts and relationships of any industry can make standards of performance apparent that may revolutionize any and all businesses and industries. I have time for but a few illustrations. A certain unit in the paper industry found itself beset by the ills which seemed to be always with that industry. It was making its product on order, to customers' specifications and samples submitted, with all the chance of dissatisfaction and error which these methods entail. The product was being sold on a price basis, which is never sound. The result was dwindling profits, which spells business death. The dominant factor in that business, with vision and foresight, began to look for the answer to the other large industries. He found it in the automobile industry, for one. He found that standardized product, mass production, service, standard prices, etc., made for manufacturing efficiency, economy of costs, volume of sales and profit; and, with vision and foresight, he set about applying these principles to his own business. The results were astonishing and were instrumental, more than any other factor, in stabilizing this great industry. Today this company's product is manufactured in a limited number of standard grades and sizes, packed in standard units, stocked by the mill, nationally advertised, distributed through recognized jobbers at standardized resale prices, with all the resulting savings to the consumer and with gratifying profit to the manufacturer and distributor.

Another illustration. Two manufacturers of the same specialty sold through hardware jobbers, together dominating their industry, in 1923 found themselves in a serious condition. In their particular industry Inventory Turnover of about four times a year was the standard. Connected with one of the concerns was a young man of vision. Strangely enough, he too, turned to the automobile industry for guidance. Two years later, by the application of the Principles of Management he was able to discover from an intimate study of the automotive industry, his company turned its Inventory twelve times. Its Inventory was approximately $700,000; its Gross Sales, $12,000,000; its Net Profits, $2,000,000. Its larger competitor, with Sales of $16,000,000, had an Inventory of $3,000,000 and Profits of $1,000,000.

As a third illustration, it is almost needless to mention Henry Ford's revolution of the Plate Glass Industry by the application of modern automotive practices.

I have a statement of ratios in 29 different Industries for the year 1926, compiled by the National Credit Office of New York City. These figures are tabulated from the records of more than 1,500 separate units in the various industries. Unfortunately, these ratios are not standards; they are merely averages, based upon the statements of these concerns which represnt the better risks of banking circles. Time does not permit us to discuss in detail any of these figures, interesting as they may be. Let me mention, however, one or two salient facts, to illustrate a point I wish to make.

I note that figures for the Return on Net Sales run from a loss of 3.82% to a profit of 9.04% for the Return on Capital Invested from a loss of 5.75% to a Profit of 17.67%.

I note that by some peculiar coincidence the Hosiery Manufacturing figures immediately follow the Cotton Cloth Manufacturing figures, and that while the Hosiery Manufacturers made a Return on Net Sales of 8.93%, and on Net Worth 17.67%, the Cotton Cloth Manufacturers show a loss on Net Sales of .73% and on Net Worth a loss of 1.55%.

I suppose the average man would say that the rising skirt dispersed the Profits of the Cotton Cloth Manufacturers and raised the Profits of the Hosiery Manufacturers. I wonder if the fact that the Hosiery Manufacturers' better ratio of Quick Assets to Quick Liabilities, or better Turnover of Net Assets, or better Turnover of Inventory, or less proportion of Net Worth tied up in Fixed Assets, or better ratio of Net Worth to Current Liabilities, or less percentage of Working Capital tied up in Inventory, may not all have been contributing factors.

I am certain that the Retail Furniture Dealer, with a collection period of 231 days, might draw some profitable lessons from the Meat Packers, with a collection period of 17 days. I am equally certain that the Automobile Finance Industry, with 311% of Net Worth represented by Total Debt, would be in a sounder position if it studied the situation from the point of view of the Flour Miller, with 15.3% of Net Worth represented by Total Debt, or of the Manufacturers of Light and Heavy Machines with 16.1% of Net Worth represented by Total Debt. Stated another way: when Turnover of Net Worth can run from .88 of one turn per year to 7.93 turns per year, there is an opportunity for some constructive analysis and thought. When Turnover of Working Capital can run from 1.76 times to 13.66 times, there is opportunity for constructive analysis and thought. When collection periods can

run from 17 days to 231 days, there is opportunity for constructive analysis and thought. When Inventory Turnover can run from three times to twelve times, when Net Worth represented by Fixed Assets can run from 76% to 1.8%, when Working Capital tied up in Inventory can run from 39.5% to 194%, there must be an opportunity for constructive thought and analysis.

The practical application of the theory I have outlined has been surrrounded with such difficulties in the past as to make it almost impossible. There are no standards generally available. Business men have been very reluctant in the past to make the statistics available. There has been no uniformity in the methods of reporting, or in the establishing of the standards. Heretofore, there has been a very general feeling that the vital statistics of a business should be kept secret. Bruce Barton, in a talk before the Boston Chamber of Commerce on March 17th, said, "If I may venture to rush in where angels fear to tread, I might remark that the motor car industry which has the fewest secrets, which opens its doors to the whole world and tells its business to everybody, is today's most successful industry. And the textile industry, which has most carefully guarded its inner workings from any unsanctified eyes, is almost at the other end of the list." Recently the tendency has been toward cooperation. With a growing realization of the importance of standards, or measures of business efficiency, and with no such statistics to which to turn, business men have been cooperating more generally in producing the necessary figures.

Our banking institutions have been particularly alive to the problem. They have been exerting a very powerful influence toward the establishing of proper standards. Such agencies as the Robert Morris Associates and the National Credit Office, have been pioneers in this work. Such an organization as the Cost Association of the Paper Industry, I am glad to say is now engaged in a study of the Paper Industry, which will be of the greatest value to that industry.

You, in your national organization, have it in your power to perform a most important work, a work that would be a monument to your foresight and vision. I can conceive of no greater contribution to industry than a thorough and complete study of standards in industry. I am told that your local chapter represents approximately sixty-five businesses, your National Organization represents many thousands of businesses. If I were a member of your organization, I would suggest that the forthcoming year or two be devoted to the analysis, preparation, and reporting of stand-

ards for the guidance of your constituent membership. Measures of business efficiency, far more complete, far more correct than now available, could be procured, and the benefits to industry as a whole would be incalculable.

In closing, I will merely summarize briefly the thoughts I wish to leave with you:

First. We, as accountants, are prone to "develop the means until they are quite inconsistent with the object to be attained."

Second. There are certain fundamentals—"Principles of Business Conduct" they have been called—which must be observed if the greatest measure of business success is to be attained.

Third. The most important of these Principles is "Knowledge, thorough and specific"—in production, in finance, in merchandising—and we, as accountants, are functionally responsible for its development and practical application in industry.

Fourth. The facts of a Balance Sheet, Profit and Loss Statement, Operating Statement, or Cost Statement, may be interesting of themselves, but they do not constitute "knowledge, thorough and specific."

Fifth. The relationships and ratios of a Balance Sheet, Profit and Loss Statement, Operating Statement, or Cost Statement, may be of more interest, but they do not constitute "knowledge, thorough and specific."

Sixth. There are certain Measures of Business Efficiency, established by competition in industry, which are essential to "knowledge, thorough and specific."

Seventh. Only when such Measures of Business Efficiency are available from all branches of industry, and only as the principles disclosed by them are applied to the specific industry, and the individual in that industry, can we say that we have "knowledge, thorough and specific."

Eighth. I can think of no agency better qualified than the National Association of Cost Accountants, and I would like to see it undertake the great task of standardizing, codifying, and establishing for Industry in America the Measures of Business Efficiency which would be instrumental in keeping American Industries in the first rank.

The Profit Element

By

JAMES H. RAND, Jr.

President, Remington Rand Company,

Tonawanda, New York

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

We are indeed fortunate in being able to present in this issue a paper by one of the business leaders of the country, in which stands out prominently the basic simplicity and saneness of the philosophy on which rests his policies of business management. To find combined in one man a grasp of the broad economic principles on which the business structure of the country rests, an ability to interpret present economic conditions from the data available, and a genius to apply those principles in the management of a business enterprise is most unusual. Our readers will be interested in seeing verified some of the predictions made in this paper about six months ago.

The author, James H. Rand, Jr., is one of those outstanding captains of American industry who has accomplished much in a comparatively short time. Although he is the executive head of Rand Kardex Bureau, a world wide organization selling more than forty million dollars worth of business management equipment every year, Mr. Rand has attained his great success before the age of forty.

Graduating from Harvard in 1908, where he had shown his aggressive character by winning his place on the varsity football team, Mr. Rand plunged into his father's business, the Rand Company, and soon won his way to the position of sales manager. In 1916 he decided to form his own organization and, borrowing $10,000, he created the American Kardex Company.

Ten years later the two concerns were merged, under the direction of Mr. Rand, placing him at the head of a ten million dollar corporation. Then followed, within an incredibly brief period, the consolidation with Index Visible, Library Bureau, Safe-Cabinet, Baker-Vawter, and Remington Typewriter, the present company being known as the Remington Rand Company.

Mr. Rand has shown exceptional capacities for organization and leadership. His abilities are many sided. He is still regarded as the star salesman of the company. He has introduced many labor-saving practices into the production of his products and invented the major features contained in Kardex.

Mr. Rand was able to build up his original com any, after repaying its first loan, entirely from the earnings of the company. He has demonstrated an exceptional grasp of sound finance. Not only is he able to see a big vision of future possibilities, but he can set to work to make that vision materialize.

Democratic and approachable, Mr. Rand knows how to retain the good will of everyone he meets and still conserve his time and physical energies for the major tasks at hand. He is well regarded locally as he is nationally, serving on the board of directors of the Marine Trust Company of Buffalo and the First Trust Company, Tonawanda.

This Official Publication is the stenographic report of a talk given by Mr. Rand before one of the Spring meetings of the Buffalo Chapter, N. A. C. A., of which he himself is a member.

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SEPTEMBER 15, 1927

THE PROFIT ELEMENT

ANDREW CARNEGIE was the first cost accountant that ever entered into business in America. He was a Scotchman and he made a most excellent cost accountant; he had a sharp pencil. He always employed Scotch assistants in financial matters wherever he could, and also throughout the shop. To give an example of how thrifty those assistants of Andrew's were, I will tell you a story that he used to tell about one of those Scotch foremen, who was walking down the street and a friend accosted him and said, "Say, Aleck, do you know that your wife was in a railroad accident?"

Aleck replied "No, was she?"

His friend said, "Yes, I saw it in the paper."

Then Aleck asked "Have you a paper?"

His friend replied, "Why, no. There is a newsboy; you can buy one from him and find out whether she was seriously injured."

Then Aleck said, "I guess I will wait until the 5 o'clock edition and then I can get the baseball news too."

Sometimes the big inside news of American financial history is not printed and is little known; but Andrew Carnegie knew his costs to the point where he was not afraid to compete with the giants of industry in those days. His contemporaries, although larger than he, did not understand costs and were largely in the hands of financiers, such as J. P. Morgan, the elder, who were good lawyers and administrators, but not practical cost accountants.

When the United Steel Corporation was formed, in the early days, it comprised about 70% of all of the then known steel companies. About this time Andrew Carnegie had made sufficient money so that he was ready to retire, and he made a proposition to the United States Steel Corporation—or rather, they asked him to make them a proposition—to sell out for $250,000,000. Mr. Morgan and some of his contemporaries talked with him and they threw up their hands. They said "$250,000,000? Why, that is outrageous! We would never think of paying you that much money." Whereupon Andrew Carnegie said "Very well, gentlemen, the deal is off."

A few years later they decided that it was necessary for them to annex Andrew Carnegie's low-cost operating unit to their corporation, the United States Steel Corporation; and Charlie Schwab, J. P. Morgan and a man named Gage sat in Mr. Morgan's living-

room from 5 o'clock in the evening until 7 o'clock the next morning, sweating blood and trying to decide whether they could get along without Mr. Carnegie's low-cost producing units; and just as the day was dawning, Mr. Morgan turned to Charlie Schwab and said "Charlie, go over and see how much you can buy Carnegie's steel business for. I have come to the conclusion that we have got to have it. His costs are too low."

Mr. Schwab then went over and talked to Mr. Carnegie and came back and said "$500,000,000 is the price, and not a cent less."

They sweat blood for a few more hours and finally Mr. Morgan said, "Go over and pay it." So they went over and closed the deal.

Now, I maintain that the lack of knowledge of operating costs on the part of J. P. Morgan and the United States Steel Corporation cost the Steel Corporation $250,000,000 in three years' time. Ignorance of costs, gentlemen—think of it—$250,000,000 in three years' time.

So the cost man has come into his own, and from that day until this, costs and cost analysis have steadily come to the front.

Twenty years ago costs and cost men and cost departments were looked upon as something up to date, something to be adopted by large institutions that had a sufficient surplus to go into the work of compiling interesting statistics, which statistics were promptly filed away.

Ten years ago we found that cost departments were becoming very generally used and were commencing to have an affect upon many selling methods. Today the cost department of the average business is looked upon as a right arm of first importance in management. Without the cost department today 90% of our businesses would be out of existence; they would not be able to live.

John H. Patterson once called a meeting of his executives for the purpose of analyzing their troubles. They were having sharp reductions in income and profit. Their income was all right, but their profits were very narrow and they could not understand it; so he called a general meeting of the executives to discover, if he could, what the trouble was; and at that meeting he called upon the executives, one by one, to suggest ways and means of immediately cutting down the costs of operation. He went around the room and they all had their say. Finally he came to Hugh Chalmers, who was then Sales Manager, and Mr. Chalmers said "Mr. Patterson, if you will pardon my reference to another department I

will tell you where we can save $100,000 a year without even affecting our business adversely in the slightest degree."

Mr. Patterson asked, "What department is that?"

Mr. Chalmers replied, "Up on the top floor of our administration building there is a whole floor full of clerks that have been there for several years. I believe it is known as the cost department, where all of our manufacturing costs are analyzed. The whole top floor is full of clerks and calculating machines and red tape. If anybody in this room—sales managers, production managers, engineers, the office manager, treasurer, vice-president, or you, Mr. Patterson—can show where any use of those figures has been made in effecting lower manufacturing costs or lower selling costs, or has ever had any influence in changing our prices upward or downward, then I will withdraw my suggestion; but I defy anybody in this room to show where that department has been used to advantage at any time during the past twelve months."

Mr. Patterson asked the question, "Can anyone in the room show where it has been used to advantage or mention any case where those figures have had a beneficial effect upon the business?"

Not one suggestion was forthcoming according to the report. Whereupon the department was promptly abolished at a saving of $100,000 a year; and I say that that department should have been abolished, and any department should be abolished which can be abolished without detriment to the business.

Today the National Cash Register Company has built up a cost department which is second to none, and which is used day in and day out, month in and month out, to check their selling prices; not only their manufacturing and operating costs, but their selling costs, their advertising costs; and every department of the business is checked against certain standards which have been set up. That department is actually a vital force in the business and is having a very commendable effect. It is now a very indispensable department, although, as it was formerly, it was just a bunch of red tape, which should have been wiped out.

And so I am coming to one of my major premises in this talk, and that is that in order to insure the element of profit in business it is first necessary to see that your work—that is, the work of the cost men, of the cost department—is actively applied to the conduct of the business.

Now, if I might make a general criticism from my observation of cost men, I might say that they have been too diffident and too

silent about the things that they know. The day is coming—in fact, it is here now—when it is time for the cost man to speak out what he knows; for him to make a noise, and make a loud noise, because he has in his grasp the figures which are going to largely control the policies of his company.

You will be interested to know what effect cost analysis has had upon our business. We manufacture one article, which we call our leader, and which is of prime importance; that is, the visible card record cabinet, known as Kardex equipment. In these recent mergers we have sought not to spread-eagle—not to spread out and take in a diversified line of equipment—but rather to put ourselves in a position where we can more quickly become of benefit to business at large through the general distribution of a superior article to displace an inferior article.

When I say it is superior, I mean that it is superior from the standpoint of the user as compared with what has been used heretofore; and it is superior from the standpoint of the manufacturer because it is a specialty and not a staple commodity. As manufacturers we found ourselves in the temporary position—perhaps in a permanent position— of manufacturing facilities for a wide, diversified line of equipment used by banks, offices, and factories.

What made it possible for us to merge, with a fair degree of certainty as to the outcome, was the analyses of these lines of business by our cost department for the purpose of finding out, not so much how good they were, how efficient these plants were, as far as manufacture was concerned, but rather to find out how inefficient they were, how many barnacles they had accumulated over a period of forty or fifty years, which nobody had taken the time or trouble to prune off, and to tabulate what could be done when our standards of operating costs were applied to those other businesses. And I want to tell you that the result was amazing. We found, for example—I say "we"; I class myself as one of the cost men because I put a large amount of my time on that analysis —our cost department found in one company we took over that 90% of the profit they had formerly been making was dissipated on high manufacturing costs, due to a variety of different practices, one of which was the making of too widely a diversified line of equipment—not enough standardization so they could get quantity production on any one of their models. We also found another case where more than half of the profit of the company—it was doing millions of dollars in volume—was produced by three articles that represented less than 25% of the total volume. Think

of it! Less than 25% of the volume was producing the majority of the profit of that company.

I have often been asked if, in merging companies, in standardizing the products, eliminating and simplifying some of them, it would not be necessary to take a drastic cut in the total volume, and my answer has always been, "If a drastic cut in total volume results, let it come." We do not want to build volume that means no profit; and one of the first fundamentals of a successful business is that it must earn a profit so as to pay dividends to its stockholders. We have found that one article manufactured by one of our companies to a volume of $800,000 per year was causing us a loss of $32,400 per year. I ask you whether it were better to continue that volume of $800,000 or cut it off? Cut it off, of course.

The cost department of the future, then, is going to have more effect upon the profits of the business and upon the general management of business than any other single department. That is a broad statement, but I am going to qualify it by saying that those of you who are cost men, those of you who are treasurers, comptrollers, sales managers, and production managers will probably agree with me when I say that the work of cost analysis has justified itself in production and should be extended to distribution. And, gentlemen, in my opinion the major portion of the work of the cost department of the future is going to be in applying recognized principles of cost analysis to sales expenses, for there is the greatest evil in present-day industry, the high cost, the extravagant, outrageous cost, of distribution.

I recently attended a meeting of the National Association of Office Appliance Manufacturers, in Cleveland, and when I made the statement that the cost of selling was eating up the vitals of American business, every man in the room apparently agreed with me, and many of them came around afterwards and wanted to know if I could give them some of our experience as to just how they could cut down that high cost of selling.

Now, to get into technicalities for a little while, let me tell you one of the fallacies of business today as far as the cost of selling is concerned. Many institutions are now figuring their cost of selling in terms of the dollars and cents which they receive for their product directly from the middle man. I want to say that, in my opinion, is a radically wrong method. The cost of selling should be figured in terms of the price paid by the ultimate consumer. I can tell you of two instances where those two policies

have clashed in our business. The Library Bureau had made a practice of selling through their own distributing organization, their branches and their own salesmen. They had a selling cost of approximately 37%. The Globe-Wernicke* Company, of Cincinnati, had always made a practice of selling, except in a few cities, through dealer distribution, and still do, at a selling cost of 3%, 3%, mind you! Which is the more efficient of those two methods of distribution? You would say, naturally, that the Globe-Wernicke policy of 3% was the more efficient; but it was the least efficient from our standpoint because they granted off the list price of their goods a discount of about 45% to 50%, depending upon the class of goods which they sold to the dealer. I hope I am not talking out of school now, but there are no secrets in our business any more. Now, you add to that discount of 45% to 50% the 3% and you have a selling cost of from 48% to 53%, as compared with the 37% of the Library Bureau, and you find that their selling costs are higher.

Now, I maintain that unless cost men can reduce the high cost of distribution and of selling, in the next few years—and it has got to be done quickly—we are facing a radical change in business, a new era in distribution. You are likely to wake up some morning and find that the world has changed in that its major products are being sold by your competitors direct from the factory to consumer instead of through the usual jobber, middle man, dealers, and the leeches on the profits all the way down the line to the ultimate consumer.

I have nothing against dealers at all, but I do believe that in order to avoid a radical disturbance in the next few years it is going to be necessary for us to cut the cost of selling. You men have got to figure out how that can be done, in co-operation with your sales departments.

I might say that we are on the verge of a test, in our own business, where, in the next few weeks, a commodity will be offered direct to the consumers from our factory, and where all intervening sales costs are eliminated. We always go by tests, and if that test is successful we may add another article to it, and then another, until who knows but what we may do all of our business direct. But those things must be given careful consideration, because right now we are facing—and many of you are aware of it—a period of the fiercest competition that the world has ever known.

* Since this paper was delivered the Globe-Wernicke Co. has resumed its original separate status.

I say that advisedly, and I am in pretty close touch with some of the biggest interests—financial and industrial—and also voice their sentiments. We are on the eve of a period of the fiercest competition that the world has ever known. I do not want to preach my own gospel—you know that I believe in the economical operation of big business; that united we stand and divided we fall, when it comes to competition and excessive operating costs; and that through mergers great economies can be effected—but I say that it is necessary for big business in the prime phases of industry to get together and trim their sales costs, either through mergers or through united co-operative action of some kind; and for this reason. On the other side of the water—in England, France, and Germany—right at this minute there are being formed cyclops of industry, giants of commerce. They are springing up on all hands and a great many of them through the aid of American capital. Those countries today are preparing for a trade war such as the world has never known. It means their life blood and they are bound and determined to get back their pre-war supremacy in foreign trade, in order to compete with the now existent large corporations in the United States, and in order to supersede, in foreign fields, the smaller corporations of the United States, they are forming these gigantic corporations with literally billions of dollars of capital back of them and, from the operating viewpoint, with the very minimum of operating costs, because Germany, Austria, Czecho-Slovakia and France are away ahead of the United States when it comes to cost analysis. I know what I am talking about because we have had a plant for five years in Germany and we have done business through forty or fifty branch offices, selling systems and methods of control to German business houses; and we have our fingers on the pulse of German capital. They are away ahead of us now on those things. Add to that, further economies in the cost of operation through combinations of capital, through the adoption of the American Henry Ford policy of straight-line production and progressive assembly, and you have something to contend with. Now, I say that our prosperity will be at stake unless we either get together or co-operate with other institutions in our line of business, in order to compete with foreign fields.

Now, mind you, the difference between prosperity and normalcy in the United States is only 20%. The fluctuations of the volume of sales of corporations represented in this room in good times, as

compared with a period of depression, will average about 20%. That 20% represents almost identically the proportion of foreign trade to domestic trade of our exports of American institutions as compared with their domestic sales volume.

Now, it makes no difference whether you are engaged in foreign trade or whether someone else is engaged in foreign trade, that 20% has got to be shipped into foreign countries in order to give us an outlet for the surplus that exists in the United States today: Therefore, I say that our prosperity is at stake unless corporations put themselves in a position where they can compete in the markets of the world.

For our own company we adopted a policy, several years ago, of going over into Germany because we expected the Germans to compete with us in American markets and we wanted to start scratch at the crack of the gun, to build up an organization in Germany, so that if anyone in Germany started to manufacture our line of goods we could have an organization that was already larger than theirs, and with lower manufacturing costs, to ship over into the United States products of our manufacture on exactly the same wage scale and production basis as they would be operating on, and they would have nothing on us when it came to producing for the United States, as well as for South America and other foreign countries.

I say that we are coming to a period of intense competition. Perhaps next year, or in 1928, you will realize more fully what I have to say. I am not a pessimist and I am not unduly, I hope, an optimist on business. I believe we are going to have a healthy condition and a period of continued prosperity. What I mean by "prosperity" and what you mean by "prosperity" may be two entirely separate things; but I am convinced that Americans are sufficiently resourceful—and the kind of talk I am handing out tonight is being handed out not only here, but all over the United States, in various ways and by various individuals, because, after all, business men throughout the United States come pretty close to talking the same language—I believe that the resourcefulness of American business men is going to cause them to rise to the occasion, so that industry will be on a basis where we can compete.

Now, in this period of intense competition you are going to see—and you are seeing it already in American business—a narrowing margin of profit. Prices of commodities are actually going to tend lower. The purchasing power of the dollar, which varies

almost inversely in proportion to the variation in commodity price levels, will gradually rise. In this period of low prices I predict—and I predict this within the next eight months—that you will see the price of one of the most important commodities with which we have to deal, i.e., money, reduced. We have at the present time $4,500,000,000 in gold in our reserves in the United States; and with the exception of one month in 1924 that is the highest level of gold supply that we have ever known. I predict that that commodity known as money is going down with the other commodities in price because of an abundance of supply; and you will see, in the next eight or ten months, another reduction in the Federal Reserve rediscount rate, which is now at 3½%; you will see the prices of bonds—I am talking about first-class gilt-edged widows' and orphans' securities—on a basis of the old-time interest rates of 3½%, 3¾% and 4% as compared with 4½%, 4¾% and 5%, as at the present time.

Now, those conditions, I want to point out, in the light of American industrial and financial history, are the very conditions that are necessary for a prolonged period of prosperity; and I am one of those who believe that we are in for a prolonged period of prosperity that will last for several years. I am not worrying about this year or next year or the following year, barring minor ups and downs. I want to say that it is up to you, the kind of language that you talk, and the kind of ideas that you spread, to maintain a healthy and optimistic attitude so long as there are no clouds on the horizon; and I, for one, am unable to pick out any clouds on the business horizon at the present time. It is a pretty generally recognized fact that the psychologic factor in business atmosphere is responsible for the extent of about 40% for good business; that the economic factor is responsible for not over 60% of prosperity. Now, if that is true, and the economic factor is sound, do not take my word for it, but listen to men like Mellon, Hoover, Charles Mitchell, Elbert Gary and all of the rest of them, who cannot afford to risk their reputation on wild statements as to financial conditions. Put them down as sound unless you know they are not; and if any man here knows of anything that indicates breakers ahead, I wish he would tell me before he leaves this room, because I do not see any. Therefore, there remains that psychologic factor, which is a 40% factor. That is the thing we have got to look out for.

There are some astounding things that I cannot help but mention in passing. According to statistics collected by the government,

of 298,000 major industries, 119,000, or 40%, showed not only no profit, but an aggregate loss in the last 12 months of $2,000,000,000. Now, that is an astounding fact; but it is due, in my opinion, to the very absence of the thing which we are seeking to introduce into business, viz.: a proper application and consideration of costs and cost analyses. There is no excuse for any business failing to make a profit or to liquidate in a solvent condition.

When the Pilgrims came over in the Mayflower they did not engage, upon landing, in a poker game, where some of them made money and the others had to starve. No. They all went into business and did serious, hard work; and they produced a living, not for one, but for all of them; and their community was prosperous although they had to use a make-shift for a medium of exchange. The industrial world today is simply a magnification of this little colony in Plymouth, and there is no reason why we should not all prosper and make money; at least, we can liquidate in a solvent condition if we follow one of the immutable laws which I am going to state, namely that we should limit our commitments to the amount of money which we take in from the sale of our product. Now, I want to state that as a cardinal principle of our business, and one which can be applied to a peanut stand or to United States Steel—After you have developed a working basis and hypothesis upon which to base your procedure, there is no reason why any corporation should not continue to operate at a profit—and a cash profit at that—or liquidate in a solvent condition. By way of proof I want to say that there is no business in the world that can go on spending or making commitments for more, in total dollars, than the cash which they take in over an extended period. In other words, if, year after year, we are going to make money in business, year after year we will have to show total commitments, which afterwards takes the form of wages and so forth, amounting to less than the cash which we take in during the corresponding period. You cannot let your commitments exceed your cash receipts; if you do, somebody has to put up the cash or you have got to get out.

If, therefore, you cannot do that—and everybody admits that fact—why try it? And if you are not going to try it, why, then, not conform. If you have been operating on a profitable basis in the last two years, analyze and find out how much you spend for manufacturing, how much for sales and subdivide that—how much you spend for advertising and how much for administrative expenses. After you have found out how much you spend, then

take your cash receipts for a quarter or six months' period and deduct, first, the amount of profit that you are sure you made, and appropriate the balance for other purposes. Now, in our business we will take off at least 10%. We are not satisfied to manufacture and stand the risk of doing business at less than a 10% profit. If we take off 10% and our cash collections are, we will say, $1,000,000 for one period, then during the ensuing period we have 90%, or $900,000, to spend for all purposes in the business. We take that $900,000 and we hand it to the various department managers—the sales manager, production manager, engineer and so forth—to appropriate as per his own ideas, which he has tabulated, with the aid of the cost department—the cost department always has its hand in it—and then his problem is to operate his department within his appropriation, and his efficiency is gauged largely by the results which he secures in the application of the funds made available to him through that budget. In the case of the advertising manager, for example, it would be just as much a sin for him to spend too little out of his appropriation as to spend too much, or exceed the allowance, because advertising is one of the main factors in getting new business. It is the life blood of the sales function. Now, all of the departments are charged with the responsibility of keeping within their appropriations, so that if they all spend up to their limit, they have spent a total of not exceeding $900,000, and we have something left. What does it amount to? $100,000, or 10% on the volume of the cash that came in. And what is that to be used for? That is to be used 50% for dividends and 50% for building up the business, in the way of additions to plant and so forth, if we need them. If we do not, it is there in the way of a reserve. I believe that that policy is being followed by a great many corporations; and whether you know it or not, if your corporation is making money, it is following, in the last analysis, that program; and it is better to follow it consciously and intentionally than unintentionally. Now, if your cash collections drop off, you are going to shrink your appropriations accordingly; but you will always be keeping your commitments within your receipts, and you will be liquidating in a solvent condition. You cannot become financially embarrassed so long as you follow that plan. The reason I say "commitments" is because if you start tabulating your accounts payable—your invoices and so forth—you are doing something that a large rubber company tried to do and found it would not work. They tabulated the damage after the invoices came in, and that is like locking the door

after the horse has been stolen, because when an invoice comes in, it must be paid; and they found that their commitments were on an aggregate larger than their balance; and they found themselves in the hands of the bankers. You must limit your commitments at the time they are made and not at the time the invoices are received.

In conclusion, I want to ask you to do something for the good of American business: try to be optimistic in your conversation. So long as there are no breakers on the surface and there are no clouds on the horizon, do the right and the square thing by business. And, mind you, if you find a man who is pessimistic and who says that things are all going wrong, you tell him point blank, "Do not speculate on the stock market and you will be all right. Get back to work and come down to earth." In other words, gentlemen, nail the pessimist in his tracks and spread this gospel of optimism, which takes care of the 40% factor of prosperity.

Now, I say to you men who are cost accountants and you men who are treasurers, and all of you who are interested in reducing the cost to make, the cost to sell, and the cost to administer, more power to you in your work; you are doing the thing that is necessary to put American industry where it belongs, to put it in position where it can compete. And do not try to economize on costs by taking the pruning knife to the payroll. That is not the place to start. The place to start is up at the top. Start with the presiden, if you will, and come down; and you will find more chances to economize among those who are holding down soft jobs at the top than you will with the men who are actually producing the goods. Go over the non-productive workers in the organization. Apply the test of indispensability to every job, and where you find that a man and his job are not indispensable, ask yourself, "What would happen if this man should drop dead?" And if you find that the business would go along without interruption to volume, to efficiency and to profit by the elimination, let him go off that job and let him go to work where he will become a productive worker. I say that industry is top heavy and it is time for us to start pruning; but let us start at the top. Wherever you find an opportunity to cut expenses, do not forget to make a noise about it and do not hesitate to speak up and call the attention of the management to those opportunities, because if you keep silent, your company is going to suffer and in the long run you are going to suffer yourself.

And so, in conclusion, I will say again that I am very glad to

belong to this Association, which has such a commendable purpose. I believe that the cost man is going to be a top-notcher; that the future presidents of corporations are going to be a sort of a combination of lawyer, cost accountant, and sales manager. Now, that does not mean that a production manager cannot also be a president; for the cost accountant factor is the most important factor in the making up of the manager. Referring again to J. P. Morgan and his lack of knowledge of the application of the principles of cost accounting to the Carnegie Steel Company, which cost him $250,000,000, do not let any of us make the same mistake of underestimating the importance of cost analysis. If we follow along the principles for which your association was organized, I say that this organization and all of the other associations which are being built up in various parts of the country, are going to have a powerful influence in business and are going to take not only the risk out of competition, but they are going to put more joy into living our business lives.

Accounting and the Factory Foreman

By

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and

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

Additional copies of this Publication may be obtained from the office of the secretary. The price to members is twenty-five cents per copy and to non-members seventy-five cents per copy.

V.1 9 No.3

EDITORIAL DEPARTMENT NOTE

The place and function of the foreman in an industrial concern has been receiving in recent years a great deal of attention and study on the part of management. Whereas formerly it was not deemed necessary nor desirable to furnish him with much information relative to the results secured by him in the operation of his department; now it is deemed very desirable and eminently fair to let him have all necessary information so that he as well as the management may be able to judge the results secured by him. We are therefore glad to present as our current publication, two papers treating of this subject.

The first is by J. Thomas Otto who has been connected for the past twelve years with the Cincinnati Milling Machine Company which has developed quite extensive analyses and statistics for the benefit of its foremen. This paper by Mr. Otto was presented before a recent meeting of the company's foremen and evidences the company's attitude toward them. Mr. Otto is Controller and Budget Director of the company and secured his accounting education through the local business colleges and the University of Cincinnati. He is a member of our Cincinnati Chapter, N. A. C. A.

H. L. Neilson, the author of the second paper, graduated from Oberlin College and shortly thereafter became manager of a mercantile corporation in a western city until he came to Dayton in 1917, where he has been associated with the National Cash Register Company, The Dayton Wright Aeroplane Company, and The Delco-Light Company, mostly in the labor and payroll divisions. In all three of these institutions, he has been in close contact with the factory foreman as well as members of the accounting division. He is vice-president of the Dayton Foremen's Club, an organization of 1,500 men, and the secretary-treasurer of the Foremen's Publishing Company, publishers of the *Foremen's Magazine*, the official organ of the National Association of Foremen. This paper is a summary of a recent talk by him before the Cincinnati Chapter, N. A. C. A.

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NATIONAL ASSOCIATION OF
COST ACCOUNTANTS
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ACCOUNTING AND THE FACTORY FOREMAN

By J. T. Otto

THIS evening we want to discuss with you the question of departmental expenses. Several times in the past I have appeared before you and talked on different items or elements of expense. Tonight I want to explain all of the items of expense that affect the shop departments.

To begin with, let us analyze the position of the Foreman. What are his duties, and what should he know as a foreman in order to assist him to operate his department efficiently and at a profit to the company and to himself?

First, the foreman is the business manager of the department. He is appointed or hired by the company the same as Jack Hendricks is appointed manager of the Reds by the Cincinnati Exhibition Co. Jack Hendricks is responsible for the hiring of the players for the different positions on the team and seeing to it that those players perform their duties in such a manner that the team will win a large majority of its games. If Mr. Hendricks is able to do this he is considered a successful manager and, likewise, if he is not able to do this with the players he has he must replace the players or he, himself, will be replaced. The foreman is required to have all the workmen in his department perform their various duties with the least amount of expense and in a way that will produce our product as cheaply as possible, consistent with good workmanship. In order to do this the foreman should know, or, as I said before, the business manager should know, just what it costs to run his department. Your department is a business in itself, and as the head of this department or business you should know all the elements of expense entering into it, so that at the end of the month or year your expenses will not be greater than your sales, and your sales are represented by the amount of productive work performed in your department.

Mr. Blank, as the general manager of this company, receives daily, weekly, and monthly reports of everything that is going on in the various sections of this business. You foremen or business managers likewise should have reports of what is going on in your departments. For example—how

many productive hours per week do you put in? How many non-producers have you for every producer? How much does your supervision cost per man? What do your supplies cost per month? How much idle time is there in your department? All this information, and more, you should have. Some of it you are able to collect yourself; a great deal of it must be collected by someone else and presented in such form that you will be able to grasp quickly the important points.

The important point that I want to put across to you this evening is *your responsibility*. The foreman in the department is the originator of all the expense for that department and is responsible for every detail and should, therefore, know the cost of every requisition he issues. If the Cincinnati Milling Machine Company should suddenly decide to hand you $50,000 in cold cash and tell you that this amount of money was to be used in paying the expenses of your department for the year, you would immediately realize your responsibility and take steps to take very good care of this money and see that it was split up in twelve parts, so that you would have enough for each month. Further, you would question each expenditure in order to find out the best and cheapest means of performing your work, because you would realize your responsibility in handling $50,000 cash. You do this very thing each year except that you do not handle cash; your responsibility, however, is just as great.

This company, at the beginning of each year, estimates the probable amount of sales it will having during the year, the material and direct labor required to produce this amount of product, and the total amount of expense. The total of these three items—material, labor, and expense—deducted from the sales, shows the probable amount of profit, if any. If the total cost is greater than the sales, steps must be taken either to increase the sales or to reduce the expense. Let us assume, however, that the report shows a normal year and a fair amount of profit. Each department is then apportioned a certain amount of money to operate on in line with the year's business. This money is divided into certain elements of expense. At the beginning of 1927 this very thing was done, and I am going to pass out folders for each department, showing the amount of expense allowed and the actual expense incurred.

FORM NO. 1*

DEPARTMENT 8—MILLING

	Budget for Year	Budget for Month	Actual	
Fixed Charges ...	$24,000.00	$2,000.00	$2,000.00	
Indirect Labor ...	20,436.00	1,572.00	1,636.53	
Supplies	6,000.00	500.00	364.57	
Repairs	5,400.00	450.00	436.29	
Small Tools	9,144.00	762.00	729.01	
Com. Ins.	900.00	75.00	73.21	
Power	4,272.00	356.00	395.47	
Tool Storage	34,344.00	2,862.00	2,753.32	
Water	648.00	54.00	63.54	
Compressed Air..	900.00	75.00	94.38	
	$100,644.00	$8,706.00	$8,546.32	
Millwright	$740.00	$57.00	$61.43	
Tool Making	15,000.00	1,153.00	1,264.78	
Tool Design	745.00	57.00	35.14	
Employees Service.	784.00	60.00	56.54	
General Mfg. Burden	22,500.00	1,732.00	1,769.53	
Total Expenses...	$140,413.00	$11,765.00	$11,733.74	$31.26
Credit Burden Earned	.....	.....	14,376.51	
			$2,642.77	
Hours	22,500.0	1,732.0	1,843.0	

The schedule of figures on Form No. 1, shows in detail the various expenses which I will now explain.

The first item shown is Fixed Charges. Fixed Charges represent the rental that we pay for the space required by your department; and includes also a charge for depreciation and use of the machine tools; the cost of maintaining the building and keeping it clean; fire insurance and taxes. You will probably ask, "How can I control fixed charges?" That seems to me to be a rather difficult item for a foreman to control. My answer is that if you require and demand more space and

*The figures above are all hypothetical and not actual.

more machine tools, this will cost you a little more, because you are causing a greater amount of money to be invested in your department.

The second item of expense is headed "Indirect Labor." The item, indirect labor, represents the cost of supervision in your department—foreman's salary, assistant foremen's salaries, labor, tool boys, helpers, truckers, porters, and any labor that is not put on productive tickets. Any labor that can be charged directly to a particular job is productive labor. Any item of labor or help that is not charged to productive labor is considered indirect. I believe considerable saving can be made in our indirect labor if we will just analyze these figures. For instance, there may be two departments located near each other where both departments have labor which is in demand only about one-half of the time. With a little planning and co-operation, this can be adjusted so that only one laborer is required. Idle time is another factor which shows up in your indirect labor, and it is up to the foreman to cut this time down to the minimum, as it costs not only the wages of the man who is idle, but also the power, light, heat, and all the other incidental expenses that go with it, and is quite an item of loss each month. It probably will amaze you to know that it may cost as much as $500 a month for idle time.

The next item of expense is "Compensation Insurance." This element of expense is based upon the total wages paid to both producers and non-producers and it represents the amount that this company each year pays into the State Insurance Fund. I do not believe any further explanation is needed.

"Supplies" are represented by such items as oil, files, grease gasoline, brooms, mops, buckets, etc. This company will spend about $90,000 this year for supplies of various kinds, and it does not take a great deal of figuring to show us that if we make just a slight effort we can reduce this expense some ten or twenty percent. I do not believe you foremen realize the importance of filling out requisitions for supplies in as thorough a manner as you possibly can. You must remember that every time that you make out a requisition you are drawing a check on the company for a certain amount of money to buy certain supplies. You should buy these supplies in as economical a manner as possible and give complete information on these tickets, because every one of them is, or should

be, sent to the cost department. Here we make a tabulation showing just how much each department has used. If you overstate the amount which you use, it shows up in your report. You should be particular, therefore, to check this item before it leaves your hands. I know that you men feel sometimes that there is a great deal of red tape connected with getting this or that out of the storeroom, but you must remember that as we buy this material we charge it up to an inventory account on the books and as we use it we credit this account. If these requisitions are destroyed or never sent to the cost department, we find at the end of six or eight months that we have over-figured our inventory, and instead of having $20,000 worth of supplies we have only $10,000. Naturally we have been fooling ourselves for a period of six months to the extent of $10,000.

The item of expense for "Small Tools" costs this company some $36,000 a year. If we are able to control this expense more strictly during the balance of the year, I am sure that we will be able to save some $5,000. This can be done, for example, by cautioning the men about the use of the tools. And you must caution them repeatedly, because it is only by repetition that you are able to drive these facts home. Remember when you request the purchase of some small tools that you are really handling cash.

As to "Repairs," you will, no doubt, tell me that repairs are well out of your control, because when a machine breaks down it *has* to be repaired and there is no argument about it. That is undoubtedly true, but you must remember that there may be some three or four different ways of repairing this machine, and it is to your interest to repair it in the cheapest and best way. I would suggest that before you order a repair you find out just what the cost of it will be; whether it is going to be $15 or $1,500. Check over your repairs; find out what it is that is costing you the most for repairs. Perhaps it may be one single machine in your department that consumes most of your repair allowance. If this is the case, you may be better off by going to the superintendent and asking him to replace that machine with a new one. The question then arises in your mind, "How will I know that it is just this machine?" The cost department keeps a complete record of all the items of repair against each machine in the shop, and you are at liberty at any time to call us on the 'phone or come to the de-

partment and find out just how much has been spent on each particular machine in your shop. Remember, however, that in order to get this information you should bring with you the machine number, as all our records are filed according to the machine number.

Charges for "Power" are made against each department on the basis of the number of motors in that department per rated horsepower, due allowance being made for the idle time of these motors. Our power bill can be cut considerably if the foremen will just make an effort to shut down the machines when they are idle and not permit them to keep on running. In order to test this out, just walk through the shop sometime and note the machines that are running idle, with no work being performed on them. Compressed air and water probably need no explanation from me. Their control, no doubt, is as obvious to you as to me.

Up to this point I have detailed to you all expenses which are entirely controllable by the departmental foremen or business managers. You will note that there is a column headed "Budget for the Year." This is the amount of expense the company has allowed for the year 1927. The second column represents the budget for the month. The third column the actual expenses incurred for the month, or just what you have actually spent. If you will compare these last two columns, item for item, you will note where you have been able to save money and where you have spent money beyond your allowance, and it is up to each one of you to bring your expenses down within the allowed amount. If you do not do this, and continue to run on as you have for the first four months of the year, our expenses are going to mount considerably beyond the safety point. If any of these items is not entirely clear to you, take time off tomorrow sometime, come to my desk, and sit down and talk it over with me, or, if you are unable to leave your department, call me up, ask me to come down, and I will explain it to you. You have in this folder a complete means of judging the performance of your department, and I believe it is a very efficient tool if you will just use it for your own good and for the company's good. Surely, if you were operating a business of your own you would want to know the facts and you would keep your hand on them constantly. Therefore, it seems to me that you should do the same thing when operating a department for this company.

THE ACCOUNTANT AS SEEN BY A FACTORY FOREMAN

By H. L. Neilson

IT HAS been but a comparatively short time, and no doubt the situation still exists in the minds of many, since the foreman knew little or nothing of the factory accountant. If perchance he did know of him, he, the foreman, was always suspicious of his actions, feeling that he was spying on his operations in an endeavor to show him up. And there may be some justification in this suspicious attitude on the part of the foreman, for the only way he knew there was such a thing as an accountant was when he was called to the superintendent's office to account for some supposed gross mismanagement of his department. He had never been told of the functions of the accounting department, and such reports as had been sent to the factory never reached him—and even if they had he could not have understood them. I dare say that factory managers themselves were not entirely sold on the real value of an accounting department, thinking of it merely as a necessary burden.

It seems to me that this rather unfortunate situation can be attributed mainly to lack of foresight on the part of management. They had been in the habit of selecting a foreman because of his superior knowledge of the mechanics of the job; because he knew tools; he knew machinery; and he knew the product. He had been told that production was to be his watchword; regardless of the effect on his own or other departments. Do you wonder then that the *cost* of production never entered his mind, that he was little concerned about the cost of scrap, the cost of supplies, and the cost of indirect labor. In his mind these things were simply necessary evils or mere incidentals. At least, he thought it was up to those higher up to do the thinking in that regard. His problem was production regardless of cost.

And thus we get a picture of the foreman's job and his attitude toward accounting as he saw it ten or more years ago.

Today a new situation looms up on the distant horizon, for competition has forced the issue. Here and there a general manager or a factory superintendent with accounting knowledge and experience has seen the new light; he has realized

the real importance of the foreman's job; he has seen that in him lies to a great extent the success or failure of the business. Through the efforts of these exceptional men, managers generally are beginning to understand that in heralding the foreman as "The Key-man in Industry" they must actually make him responsible for the proper management of his department; they must in truth make him a real manager.

What is a manager of a department in industry and what are his responsibilities? Let me illustrate by asking, What is a manager of a chain grocery, hardware, or clothing store and what are his responsibilities? He is a man who has been placed in complete charge of that particular branch of the business and from him a fair profit for the business is expected. If after a reasonable time he fails to show suitable returns, he fails as manager and no doubt loses his job.

How does this manager know whether or not he is making a profit? That is simple; he just sits down and figures the data that are at his disposal. He knows the cost of his merchandise; the cost of operation, such as rent, light, heat, advertising, clerk hire, taxes, insurance, supplies, and waste; and he knows the selling cost. So all he has to do is to take the cost of his merchandise at the end of the last fiscal year, add to that the amount purchased in the interim, and deduct the same from the total retail sales and he has his gross profit. Deducting his expenses he has his net profit. If this shows the required interest on the investment and he has the good will of his customers and employees he has made good on the job.

Now let us go back to the factory and think of the foreman's responsibility in that same light. Can we not picture him as manager of one of a chain of manufacturing units and as one from whom management expects a profit? I am satisfied that we can, and I sincerely believe that modern progressive industries are headed in that direction.

It is at this point that a very serious question arises, "How is this factory department manager, the foreman, going to know when he is making a profit?" He does not have at his disposal the same data that the store manager has. In fact that would be rather difficult to obtain since the factory foreman does not sell directly to the consumer, neither does he buy from a manufacturer. Some other method therefore must be devised in order that the proper information may be fur-

nished that will enable him to determine whether or not he is making the desired profit. It is upon the accounting department that this great and important responsibility rests.

And now do you see the new picture? Management on the one hand, through the accounting division, is seeking not only to fix responsibility but eager and anxious to supply the foreman with the necessary data to enable him to assume that responsibility; the foreman on the other hand, is emerging from his attitude of production regardless of cost to a production basis of the best quality product at the lowest possible cost. Through modern educational efforts the foreman is beginning to realize that to be successful in the future he must not only know the mechanics of his job, but he must also know something of accounting; he must know how to teach and supervise the men under his control. *Formerly he knew materials, now he must know more about money and men.*

It is an interesting co-incident to note that the foreman and the accountant have been undergoing these far reaching changes at the same time. Yesterday these three elements were somewhat antagonistic to one another because they did not understand each other's problems. Today they are working together, each trying to assist the other in one common object, namely, that of making a legitimate profit not only for the owners of the business, but for the makers and consumers of the product as well.

The job then of the industrial accountant today is to supply the foreman with such information as will not only increase his interest in the job but will assist him in determining whether or not he is succeeding or failing in his tasks. This information must of necessity be in the language of the foreman and free as far as possible from all accounting phraseology. The accountant must realize that he is serving industry by supplying them with direct information on their affairs. What a change from that of yesterday when he was looked upon as a necessary burden supplying treatises that business men themselves could not understand. James H. Bliss very aptly said, "The value of financial and operating statistics lies in the story they tell about a business—the conditions of its financial affairs and the efficiencies and the results obtained in its operations. However, as financial statements are commonly presented this story has to be read out of them." He continues, "Of all the financial statements read by

the multitude of business men interested in and using such statistics probably not one in a thousand tells the full story it should to its readers." A very severe indictment, I dare say.

Contrast that state of affairs with the following advertisement that recently appeared in a current magazine, "The Standard cost system is a guide to current operations. Each day you receive a brief understandable summary of your previous day's results with actual costs compared against carefully computed standards. Needless detail is omitted; emphasis is placed on essentials. Each item that ran too high is in red so you can see at a glance where you need to put pressure to get your costs in line. You know just where you stand at all times. You do not have someone coming along a couple of weeks, a month, or even after the cause of an increase has been forgotten, to ask why some item cost as much as it did." And therein lies the solution of the foreman's problem.

It is the aim of the Delco-Light Company to carry out a similar scheme. Our budget department is gradually establishing standards on all controllable overhead items for each and every department. Wherever possible we hope to have daily summary reports of the previous day's operations which the foreman or department head can compare with the objective of his department. If his scrap report is much above that of the previous day he can make an immediate investigation and ascertain the cause while the details are fresh in the minds of the operators; if his supplies are high he can at once satisfy himself as to the cause. With such information rushed to the firing lines at the earliest possible moment the foreman becomes interested and at once sets to work to remedy the situation if possible. If his schedule is raised his expense items are increased proportionately; if it is decreased a corresponding reduction is made. If a foreman meets these standards or objectives or keeps below them he is making a profit on his business and should be considered a success. On the other hand if he continually runs beyond the objectives and has no satisfactory reason or explanation he is not making a profit and should be pronounced a failure on that particular job.

In addition to these detailed efforts to keep a foreman posted on the affairs of his particular job, we hold monthly meetings for all foremen and prospective foremen for the purpose of general instruction and weekly group meetings for the purpose

of specific instruction. It is our intention to make a foreman a real manager of his job.

You will be interested in knowing something of the purposes of the National Association of Foremen for it was this very thing that prompted its organization. It was seven years ago when Mr. Fordham, an industrial engineer, now Works Manager of the Delco-Light Company, came to Dayton. His experience up to that time in investigating industries that were well on the road to failure had led him to believe that there was in general a common cause for all these conditions. He saw that these industries were not making a success because their managers were neglecting to place the proper responsibility on the foremen. He also perceived that a majority of these foremen were not capable of bearing the responsibility that of right belonged to them. Two problems, therefore, confronted this man: (1) to sell management on the importance of the foremen in industry, and (2) to educate the foreman so that he would be able to bear increased responsibility. While he was revolving these problems in his mind he was invited to attend a meeting of the Dayton Foremen's Club. He was so interested that he came the second time and all at once his countenance brightened for he had found the means of meeting this need. He became president of the local club and during his two years of service in that office he organized the National Association of Foremen which today has a membership of over eight thousand and is growing every day.

It is the express purpose of this association, "to help in the promotion of better foremanship, by studying the needs and opportunities of industry in order to make each individual foreman a power for good in his own organization and community." We believe industry is entitled to a suitable return or profit on its investment and shall bend forth every effort through the proper training of foremen to accomplish this end. We hope to awaken the latent powers in foremen to their increasing responsibilities and shall endeavor to elevate their standards to that of professional men where they will not only seek information relative to their particular jobs, but will be able to understand and use the information when received.

Budget of Financial Operations

By

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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BUDGET OF FINANCIAL OPERATIONS

At this time of the year, the work involved in a preliminary shaping up of the plans, policies, and budgets for the new calendar year, occupies a prominent place among the duties of the accounting or other department entrusted with this phase of executive control. Ten years back the proposal to look and plan far enough ahead to make possible the set-up of complete budgets covering all departments of a business and a summary budget properly correlating all these departmental budgets into a financial budget for the whole, would have met with a skeptical reception on the part of most business executives. The budget as a tool of executive control has made great headway since that time. A rather flourishing literature dealing with the benefits and advantages of the budget and with a statement of the principles of budgetary procedure has come into being. That literature has, however, been quite barren of illustrations dealing with the facts, figures, and forms involved in the formulation and set-up of a complete budget program. We are glad, therefore, to be able, through the courtesy of the General Electric Company, to present this paper by E. H. Corregan, a member of the Albany Chapter.

Since 1912 Mr. Corregan has been employed in accounting and financial work for the General Electric Company and associated interests. Since 1923, as assistant auditor, he has been in general charge of accounting relating to all manufacturing operations, and cost research and analysis work.

It has been his good fortune to participate actively in the development of the Business Training Course of General Electric Company, by means of which college and high school graduates are afforded the opportunity of an intensive training in the theory of elementary and advanced accounting, auditing and industrial analysis and control, and its practical application in the affairs of a large manufacturing corporation. In this course he has served as a special lecturer on industrial analysis and control.

This material was presented before a recent meeting of the Albany Chapter, National Association of Cost Accountants.

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BUDGET OF FINANCIAL OPERATIONS*

BUSINESS men have learned to use the balance sheet, which shows where they are at a given date.

They have also learned to use the profit and loss operating statement, which shows them how they got where they are.

They are just now learning to use the co-ordinated sales forecast, the estimated expenditures and the other details of budgetary control, which will help to show them where they are going and how they are going to get there.

Although budgetary plans of limited scope, such as those relating to individual departments or classes of expense, have been in use by some companies for many years, complete and comprehensive budgets of all financial operations, including income, expenditures, and profit and loss results, are still in the developmental stage and have been adopted by comparatively few companies. The necessity for such budgets arises from the fact that income from a given volume of output usually is limited to the return from selling prices established often in advance of sales and under the influence of sharp competition, and the possibility that such income may be inadequate to take care of all expenditures unless they are held within predetermined limits and the further possibility that the income, unless allotted in predetermined proportions to specific projects and uses, may be devoted too largely to minor needs, to the prejudice of more important ones.

Among the advantages which have been ascribed to effective budgeting by numerous articles recently published to arouse interest in the subject are the following:

1. Everyone in the establishment has a definite goal to attain.
2. Sales and production plans are co-ordinated with financial resources.
3. More continuous operation and greater regularity of employment are provided.
4. Products, processes, and equipment can be standardized.
5. Costs can be used for purposes of control rather than as historical information.
6. Reduction of waste is encouraged by the maintenance of better balanced inventories, by instituting wage payments based upon

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results, and by definitely assigning responsibility for expenditures.

7. Taken in conjunction with the business cycle, the budget gives warning when to be cautious and provides the cue to go forward with manufacturing plans.
8. At all times, the budget serves as a measuring stick to compare actual performances with promises and standards, showing not only what may be done but what should be done.

A comprehensive plan of budgeting embodies careful estimates or forecasts based upon experience, but tempered by prevailing conditions, of the following results of operations:

1. Financial operations:
   a. Orders received, quantities and values, for each class or products.
   b. Sales billed.
   c. Cost of sales billed.
   d. Commercial and administrative expense.
   e. Net margin.
   f. Net profit or loss, including income from sales other than of regular products, and sundry charges, such as interest on borrowed money and profits taxes.
   g. Dividends.
2. Cash receipts and disbursements.
   a. Receipts arising from sales of regular products.
   b. Miscellaneous receipts.
   c. Disbursements for accounts payable:
      Materials and purchased parts.
      Supplies.
      Payrolls, segregated between charges to direct labor and various classes of expense.
      Other expense items, such as rent, taxes, insurance, and legal fees.
      Additions to manufacturing plant.
   d. Other disbursements, such as for interest, dividends, and purchases of securities.
   e. Disbursements account of principal of existing interest bearing and other capital obligations, and receipts from new financing.

3. Balance sheet as of the close of the period.

These are usually made for periods of a year, but by shorter intervals, such as months or quarters.

The fundamental basis for budgeting is the anticipated volume of business, because upon this will depend the amount of ordinary income available to carry on the various lines of activity, and, to a large extent, the volume of work to be undertaken and expenditures to be incurred. Because of the many variable and intangible factors affecting business conditions, it is obviously quite impossible to predict exactly the volume of sales for a year, or even a quarter. If budgets are to serve effectively the purposes for which they are designed, they should be sufficiently flexible so that they may be applied to the volume of business actually done. A practical method of accomplishing this is to prepare forecasts of financial operations for minimum, maximum and intervening volumes of business that may develop.

The logical starting point for a general budget for a going concern is its balance sheet, supported by analyses of current assets and liabilities and a memorandum of unfilled orders. It is important that budgets be available in ample time, not less than a month before the beginning of the period to which they relate, to afford the executives an opportunity to consider them and make such modifications as may seem wise. In order to carry out this plan, the latest available balance sheet must first be projected to the beginning of the budget period. This necessitates, of course, the estimating of financial operations for the balance of the current period. For illustration, if a budget for the next calendar year is being prepared, the balance sheet at the end of September or October would first be projected to December 31st of the present year.

Orders received are, in many instances, only an indirect factor of financial operations because they represent shipments to be made over an extended period of time. Except for commercial expenses, earnings and expenditures are contingent more largely upon sales billed. However, orders form the basis for projecting sales billed, hence estimates should be carefully prepared by sales managers and those who are in direct contact with markets. To afford a basis for accurate estimates of *cost of sales*, estimates of orders must be detailed, so far as possible, according to types, sizes and

quantities, for each line of product. Estimates of total volume only would be of little value as a basis for a complete budget, except when a company manufactured only one product.

Sales billed is the more direct measuring stick of financial operations. Estimates of gross sales billed are obtained by projecting estimated orders received, together with unfilled orders on hand, according to probable shipping dates. Cash discounts or prompt payment and quantity discounts allowed, unabsorbed out-going transportation, and other items which are deductions from gross sales billed, should be considered in determining net sales billed. These items may be calculated by applying to projected total gross sales billed average ratios of discounts, etc., for previous periods. If the allowances apply only to certain classes of products, or are not uniform, it is preferable to base estimates upon experience and individual sales billed forecasts for individual lines.

Costs of sales billed should be based upon carefully prepared estimates of manufacturing costs. Estimated material and direct labor costs may be determined with the aid of drawings, specifications, and labor operation layouts, etc., with allowances for probable changes in costs of material, labor, and in design, methods of manufacturing, etc. The amount of factory overhead per unit should be based upon average or normal rates of overhead, determined from estimates of expenses covering the anticipated range or cycle of production.

Commercial and administrative expenses fluctuate somewhat with the volume of orders received. To afford a basis for determining the amount to be included in total cost per unit, to be provided for in the projected summary of operations, and for use in preparing budgets for various volumes of business, estimates of expenses for a considerable range of volume of orders received should be prepared. The amount of expense applicable to the estimated volume of orders for the budget period should be included in the projected summary of financial operations.

To arrive at the net profit figure, estimates of sundry income and deductions from net margin should be based upon experience, tempered by prevailing conditions. Interest charges will depend upon existing obligations, future liquidations and additional borrowings. The projection of cash receipts and disbursements affords a basis for estimating such charges. Income taxes depend upon net profits,

and may be estimated, based upon the results shown by the projected summary of financial operations.

As to dividends, the projected summary will indicate whether or not, and to what extend, profits will be available for dividends. If cash dividends are contemplated, however, the projection of cash receipts and disbursements should be consulted to determine the likelihood of there being surplus funds available for such payments.

Projections of receipts and disbursements enable plans of financing to be arranged well in advance of the time that capital is actually required, and afford a basis for regulating expenditures to accord with cash resources. For companies with limited capital, such projections are indispensable, and to serve most effectively, should be made by months, or even by weeks.

Receipts representing sales of regular products, or from customers' notes and accounts receivable should be determined by reviewing trial balance of accounts at present outstanding, and by projecting the larger items individually, according to their probable dates of payment. This review will bring to light any items the collection of which may be doubtful or may extend beyond a reasonable period of settlement. Receipts from estimated sales billed may be projected upon the basis of the average turnover of receivables.

Miscellaneous receipts should be determined from past experience, with the usual regard for probable conditions.

Disbursements for outstanding accounts payable, including payrolls, should be projected based upon a trial balance of these accounts. Payrolls will be payable in the immediate future, and the preponderance of the other items probably within 30 days, but, payments of bills for machinery or taxes may extend well in the future. There are several steps incidental to a projection of future accounts payable:

1. Unfilled orders, estimated orders received, and projected shipments should first be studied carefully by the manufacturing departments, and a program of production mapped out that will provide for maintaining economical manufacturing conditions, continuous employment of labor and effective utilization and balancing of inventories. This program may not conform to the projection of shipments throughout the period, but it should

aim to meet estimated deliveries, unless the latter are too inconsistent with a reasonable plan of production. In that case the sales department should be called on to modify its schedules.

2. Inventories on hand at the beginning of the period should be analyzed to determine the extent to which they should be adjusted to conform to the program of production.
3. Projections of requirements of materials, purchased parts, and direct labor payrolls may then be made.
4. Based upon the estimates used in determining normal rates of overhead, budgets of expenses conforming to the program of production should be prepared.
5. Expense should be segregated as follows:
    a. Items which clear directly through accounts payable, such as payrolls, traveling expenses, etc.
    b. Supplies, tools, etc., to be withdrawn from stores.
    c. Deferred charges and accruals, such as taxes and insurance.
    d. Depreciation.

This segregation is necessary because the charges to expense for the last three items are not made concurrently with disbursements, and each of them follows a different course through the accounts.

6. All other classes of expense should be budgeted and segregated in the same manner.
7. A projection of future accounts payable should be made, including purchases of raw material and supplies, direct labor payrolls, expense payrolls and other items which clear directly through accounts payable, taxes, insurance and similar items, and anticipated additions to manufacturing plants.
8. This projection should then be extended according to probable dates of disbursements.

Other disbursements, including interest, dividends, purchases of securities, etc., because of their special or unusual nature, or because they are contingent to some extent upon ordinary receipts and disbursements, should be treated separately and not confused with regular accounts payable.

Disbursements account of principal of existing interest bearing and other capital obligations, and receipts from new financing depend largely upon the projection of cash receipts and disbursements. Hence, these should first be summarized.

The preparation of a projected balance sheet is merely a matter of summarizing by accounts the transactions included in the projections of financial operations and of cash receipts and disbursements, and adjusting the opening balance sheet accordingly.

Finally, the projected summaries of financial operations and of cash receipts and disbursements, and the projected balance sheet should be compared with the actual results for previous periods, and any glaring inconsistencies carefully analyzed and explained. If the estimated results are unsatisfactory, the estimates of costs and the detailed budgets must be carefully scrutinized and modified wherever possible, bearing in mind that a complete budget, if it is worth preparing, must be adhered to.

It is difficult to understand the mechanics of preparing a general budget through discussion of abstract principles. For the purpose of illustrating the practical work of budgeting, a simple example has been worked out, which, with necessary explanations, is shown as Appendix A. This illustration has as its starting point the balance sheet of a company as of December 31st. The procedure in arriving at this statement from any date during the year is precisely the same as that in projecting results for the following year, and has, therefore, been omitted.

APPENDIX A

BUDGET OF FINANCIAL OPERATIONS FOR YEAR
COMPANY X

Company X is engaged in manufacturing two classes of products, "Product A," a small and inexpensive device, which can be produced in a short period of time and "Product B," a complicated and relatively costly type of apparatus requiring several months to produce. A budget for the ensuing calendar year is to be prepared. The projected balance sheet, as of December 31st of the current year, is shown on Figure 27.1, page 143.

Projected Summary of Financial Operations

The projected summary of financial operations is shown on Figure 27.2, page 144, the details of which were developed as follows:

Orders Received. Estimates of orders received, prepared by the Sales Manager, after consulting with the salesmen, are as follows:

	Product A		*Product B*	
	Units	*Selling price*	*Units*	*Selling price*
1st Quarter	20,000	$60,000	50	$25,000
2nd "	25,000	75,000	..	.....
3rd "	30,000	90,000	10	5,000
4th "	25,000	75,000	140	70,000
	100,000	$300,000	200	$100,000
Unfilled orders at beginning of period..	10,000	30,000	50	20,000
	110,000	$330,000	250	$120,000

Product "B" is comparatively new and the selling price during the peroid of exploitation has been $400 each. It is believed that its all around merits are well recognized and that its quality and performance will be improved and perfected during the coming year so that the price may be increased to $500 per unit. The increase is thought to be justified by the following facts:

1. About one-half of the total capital investment ($175,000 to $200,000) applies to product "B."

2. The net margins at the old and new prices are as follows:

Selling price	$400	$500
Estimated manufacturing cost...	300	300
Commercial and administrative expense 25%	75	75
Total cost	$375	$375
Net margin	25	125
Federal taxes and interest.....	3	16
Available to stockholders.....	$ 22	$109

3. It is believed that sales will average about 300 units per annum, resulting in net profits as follows:

Selling price.....	$400	$500
Net profit per unit	22	109
Net profit 300 units.....	6,600	32,700
Stockholders' investment	200,000	200,000
Return on investment.....	3.3%	16.3%

Stockholders' investment represents one-half present capital stock and surplus, plus investment of increment to surplus in additional assets necessary for production of 300 units per annum.

Sales Billed. Estimates of gross sales billed prepared by the Sales Manager, are as follows:

	Product A	*Product B*
	Units	*Units*
1st Quarter	20,000	50
2nd "	25,000	40
3rd "	25,000	10
4th "	25,000	80
	95,000	180
Unfilled orders end of period.	15,000	70
	110,000	250

The projected shipments of unfilled orders and estimated orders received are shown on Figure 27.2A, page 145.

The terms of payment are, product "A," 2%—10 days, 30 days net; product "B," 30 days net. Experience indicates that about one-half of the billing of product "A" is discounted, or that the discounts average 1% of sales billed.

Cost of Sales Billed. Based upon specifications and layouts of operations, the estimated costs of material and direct labor per unit are as shown on Figure 27.2C, page 147. An increase of 10% in material costs is contemplated during the last half of the year.

In order to determine the factory overhead per unit, the estimates of expenses for each class of product—shown on Figures 27.2D and 27.2, page 149—were prepared. These estimates cover a wide range of production, so that they will be flexible enough to apply to prevailing operations. In the case of product "A," the range is from 40,000 to 200,000 units per annum; for product "B," from 125 to 500 units per annum. These estimates over a

wide range of production also make it possible for the average or normal rate of overhead for a cycle of operations to be determined. It is estimated that the output of product "A" will average 100,000 units per annum, for which volume the rate is 100% of direct labor. Although the output of product "B" for the ensuing year will not reach the anticipated average of 300 units per annum, referred to above, the decision is to use the rate for that volume (150%) in determining costs.

The estimated cost of sales billed was determined by applying the estimated manufacturing costs to the expected shipments during the year, as shown on Figure 27.2B.

Commercial and Administration Expenses have been estimated for a range of volumes of orders received, so that these estimates may also be readily adjusted to prevailing conditions. The estimates are shown on Figure 27.2G, page 151. In practice, it would be desirable to segregate the expense applicable to each class of product and determine separate rates, as in the case of factory overhead, but for simplicity this has not been done in the illustration.

The commercial and administrative expense applicable to the estimated orders received—the manufacturing cost—for the year, was determined with the aid of the estimates given in Figure 27.2G, and is shown on Figure 27.2F, page 150.

Interest on notes payable is based upon anticipated borrowings, as shown on Figure 27.3, page 152.

Dividends. The estimated net profits after providing for federal taxes indicate that dividends at the regular rate of 8% may be paid, leaving an increment to surplus equivalent to about 5% of capital stock.

Projected Cash Receipts and Disbursements

This projection shown on Figure 27.3, was developed as follows:

Cash Receipts, Customers' Accounts. Receipts from outstanding accounts and projected sales billed are shown on Figure 27.3A, page 153. The detailed trial balance of receivables has been omitted for the sake of simplicity but the effect of the deferred collections on delinquent accounts is shown. It is assumed that the turnover of receivables for product "A" is about 30 days, and that the period

of collection for sales of product "B," the terms for which are 30 days net, will average about 45 days.

Allowances for cash discounts are based upon sales billed, although in practice there would probably be some lag due to the increasing volume of shipments.

Cash Receipts, Sundry Debtors, representing sales of scrap, have been projected, based upon experience.

Accounts Payable Disbursements are projected on Figure 27.3C, page 155. Disbursements for outstanding payables and purchases of materials and supplies have been projected upon the basis of an average period of payment of about 30 days. This assumes that some of the bills are subject to cash discount, but to simplify matters the time of discounts on purchases has been omitted. Salary payrolls are usually paid within the period to which they relate, but one week is held back in the case of direct labor and other shop payrolls. The latter have been projected accordingly. Disbursements for insurance and taxes occur at irregular intervals, and rent usually is paid in advance. The disbursements for these items are shown separately because they do not relate to the periods during which they are made, and are chargeable to deferred charge or accrual accounts.

Projected Requirements of raw materials and supplies, also direct labor payrolls, are shown on Figure 27.3D, page 156. For this purpose a program of production was developed. An analysis of merchandise inventories indicates that finished units, work-in-process and raw materials for product "A" are not inconsistent with this program. The inventory of raw materials for product "B," however, will be reduced to conform to the schedule. Allowance for the SALVAGE VALUE of defective work is shown separately, the difference between cost and such value being included in unit costs of the products. Purchases of supplies have been projected on the basis of replenishing stocks concurrently with consumption, as shown by the budgets of expenses, although ordinarily, this might not be the case.

Projected Factory Expenses are shown on Figure 27.3E, page 157, and are segregated according to payrolls and other items which clear through accounts payable stores and deferred charge and accrual accounts, and depreciation. The amounts of expense for each period were determined with reference to the estimates of expense

for a range of production, as shown on Figures 27.2D and 27.2E, pages 148-149.

Dividend Disbursements are shown apart from regular accounts payable on Figure 27.3B, page 154.

Notes Payable Transactions. Inasmuch as renewals or additional borrowings are contingent upon the cash balances available after making all other disbursements, these transactions, together with interest thereon, are shown on the projected summary of receipts and disbursements, Figure 27.3.

Projected Balance Sheet at End of Period

The balance sheet projected to the end of the budget period is shown on Figure 27.4, page 158, and the transactions during the year are summarized according to accounts on Figure 27.4A, page 159. Attention is called to the fact that the transactions are entered on the latter exhibit from the same source that they would be in the books of account. For example, cash discounts allowed, which are shown on the projected summary of operations, also the projections of receipts from customers' accounts (the equivalent of the cash book) are entered from the latter. It is important to follow this procedure, otherwise confusion may result.

Unliquidated Factory Overhead. Inasmuch as merchandise inventories should be carried at not more than normal costs they should be relieved of charges in excess of the normal rates of overhead. The adjustment affecting the projected balance sheet is shown on Figure 27.4B, page 160.

COMPANY X

BALANCE SHEET—DECEMBER 31ST

Assets		
Manufacturing plant		$250,000
Less: Reserve for normal depreciation		50,000
		200,000
Merchandise inventories		100,000
Customers' accounts		50,000
Sundry debtors		5,000
Cash		20,000
Total current assets		175,000
Prepaid rent		20,000
Prepaid taxes and insurance		5,000
Total		$400,000
Liabilities		
Notes payable (Due Jan. 2)		30,000
Accounts payable		20,000
Total current liabilities		50,000
Capital stock		300,000
Surplus		50,000
Total		$400,000
Unfilled orders		$ 50,000

Figure 27.1

COMPANY X

PROJECTED SUMMARY OF OPERATIONS—YEAR ENDED DEC. 31ST

Gross sales billed (Per Figure 27.2A)	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Product A	$60,000	$75,000	$75,000	$ 75,000	$285,000
Product B	21,000	19,000	5,000	40,000	85,000
Total	81,000	94,000	80,000	115,000	370,000
Cash discounts	600	750	750	750	2,850
Net sales billed	80,400	93,250	79,250	114,250	367,150
Cost of sales billed (Per Figure 27.2B)	55,000	62,000	55,600	77,300	249,900
Gross margin	25,400	31,250	23,650	36,950	117,250
Commercial and administrative expense (Per Figure 27.2F)	17,500	17,500	17,500	18,750	71,250
Net margin	7,900	13,750	6,150	18,200	46,000
Interest paid (Per Figure 27.3)	300	150	300	300	1,050
Profit available for taxes and dividends	7,600	13,600	5,850	17,900	44,950
Federal taxes 12½% (Approx.)	900	1,700	650	2,150	5,400
Dividends 8%	6,000	6,000	6,000	6,000	24,000
Surplus for period	700	5,900	(Deficit) 800	9,750	15,550
Surplus beginning of period	50,000	50,700	56,600	55,800	50,000
Surplus end of period	$50,700	$56,600	$55,800	$ 65,550	$ 65,550

Figure 27.2

COMPANY X

PROJECTED GROSS SALES BILLED—YEAR ENDED DEC. 31ST

	Unfilled orders beginning of period:		1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Unfilled orders end of period	
	Units	Value	Units	Amount	Units	Amount	Units	Amount	Units	Amount	Units	Amount
Product A ...	10,000	$ 30,000	10,000	$30,000								
Product B ...	50	20,000	40	16,000	10	$ 4,000						
		$ 50,000										
Estimated orders received:												
Product A												
1st Quarter.	20,000	$ 60,000	10,000	30,000	10,000	30,000						
2nd Quarter.	25,000	75,000			15,000	45,000	10,000	$30,000				
3rd Quarter.	30,000	90,000					15,000	45,000	15,000	$ 45,000		
4th Quarter.	25,000	75,000							10,000	30,000	15,000	$45,000
	100,000	$300,000										
Product B												
1st Quarter.	50	$ 25,000	10	5,000	30	15,000	10	5,000				
2nd Quarter.	....	....										
3rd Quarter.	10	5,000										
4th Quarter.	140	70,000							10	5,000		
									70	35,000	70	35,000
	200	$100,000										
Summary												
Product A ...	110,000	$330,000	20,000	60,000	25,000	75,000	25,000	75,000	25,000	75,000	15,000	45,000
Product B ...	250	120,000	50	21,000	40	19,000	10	5,000	80	40,000	70	35,000
		$450,000		$81,000		$94,000		$80,000		$115,000		$80,000

Figure 27.2A

COMPANY X

PROJECTED COST OF SALES BILLED—YEAR ENDED DEC. 31ST

	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Year
	Units	Amount	Units	Amount	Units	Amount	Units	Amount	Amount
Estimated gross sales billed (Units) (Per Figure 27.2A)									
Product A									
Material (Per Figure 27.2C)	20,000	$20,000	25,000	$25,000	25,000	$27,500	25,000	$27,500	$100,000
Direct labor "		10,000		12,500		12,500		12,500	47,500
Overhead "		10,000		12,500		12,500		12,500	47,500
Total "		$40,000		$50,000		$52,500		$52,500	$195,000
Product B									
Material (Per Figure 27.2C)	50	$ 5,000	40	$ 4,000	10	$ 1,100	80	$ 8,800	$ 18,900
Direct labor "		4,000		3,200		800		6,400	14,400
Overhead "		6,000		4,800		1,200		9,600	21,600
Total "		$15,000		$12,000		$ 3,100		$24,800	$ 54,900
Total		$55,000		$62,000		$55,600		$77,300	$249,900

Figure 27.2B

COMPANY X

ESTIMATED COSTS PER UNIT—YEAR ENDED DEC. 31ST

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Product A				
Material	$1.00	$1.00	$1.10	$1.10
Labor	.50	.50	.50	.50
Overhead (100% D.L.) (Per Figure 27.2D)	.50	.50	.50	.50
Total	$2.00	$2.00	$2.10	$2.10
Product B				
Material	$100	$100	$110	$110
Labor	80	80	80	80
Overhead (150% D.L.) (Per Figure 27.2E)	120	120	120	120
Total	$300	$300	$310	$310

Figure 27.2C

COMPANY X

ESTIMATED FACTORY OVERHEAD—PRODUCT A

Direct labor payroll per annum

		$20,000-$40,000		$40,000-$50,000		$50,000-$75,000		$75,000-$100,000		
		No. of emp.	*Amount*	*No. of emp.*	*Amount*	*No. of emp.*	*Amount*	*No. of emp.*	*Amount*	
Supervision	(a)	1	$ 3,000	1	$ 3,000	1	$ 3,000	1	$ 3,000	
Foremen and assistants	(b)	2	3,300	3	4,800	4	6,000	5	7,200	
Clerical	(b)	2	2,200	3	3,000	3	3,000	4	3,800	
Shop supplies	(c)		1,500		2,500		3,000		4,500	
Non-durable tools	(c)		2,000		4,000		5,000		7,000	
All other operating expense	(d)		1,600		2,200		3,500		4,000	
Power, heat and light	(e)		4,000		7,000		8,000		11,000	
Maintenance:										
Labor	(b)		400		500		500		750	
Material	(c)		1,200		1,500		1,500		2,250	
Assessed charges:										
Salaries	(a)		2,000		2,500		2,500		2,500	
Other expense	(d)		800		1,000		1,000		1,000	
Depreciation	(f)		10,000		10,000		10,000		10,000	
Taxes and insurance	(g)		3,000		3,000		3,000		3,000	
Total overhead			$35,000		$45,000		$50,000		$60,000	$190,000
Direct labor		30	$20,000	60	$40,000	75	$50,000	100	$75,000	$185,000
Ratio—expense to direct labor			175%		112.5%		100%		80%	
									Average ratio	103%
									Use	100%

Figure 27.2D

COMPANY X

ESTIMATED FACTORY OVERHEAD—PRODUCT B

Direct labor payroll per annum

	$10,000-$15,000		$15,000-$25,000		$25,000-$40,000		$40,000		
	No. of emp.	*Amount*	*No. of emp.*	*Amount*	*No. of emp.*	*Amount*	*No. of emp.*	*Amount*	
Supervision ..... (a)	1	$ 3,000	1	$ 3,000	1	$ 3,000	1	$ 3,000	
Foremen and assistants ..... (b)	2	3,300	2	3,300	2	3,300	3	4,800	
Clerical ..... (b)	2	2,200	2	2,200	2	2,200	3	3,000	
Shop supplies ..... (c)		1,000		1,500		2,000		2,500	
Non-durable tools ..... (c)		1,500		2,000		3,000		4,000	
All other operating expense ..... (d)		1,900		2,300		2,600		4,300	
Power, heat and light..... (e)		3,000		4,000		6,000		8,000	
Maintenance:									
Labor ..... (b)		200		300		500		500	
Material ..... (c)		500		1,000		1,500		1,500	
Assessed charges:									
Salaries ..... (a)		1,000		1,000		1,000		1,000	
Other expense ..... (d)		400		400		400		400	
Depreciation ..... (f)		10,000		10,000		10,000		12,500	
Taxes and insurance ..... (g)		2,000		2,000		2,000		2,500	
Total factory overhead		$30,000		$33,000		$37,500		$48,000	$148,600
Direct labor	15	$10,000	20	$15,000	30	$25,000	50	$40,000	$ 90,000
Ratio—expense to direct labor.....		300%		220%		150%		120%	
								Average ratio	165%
								Use	150%

Figure 27.2E

COMPANY X

PROJECTED COMMERCIAL AND ADMINISTRATIVE EXPENSE—YEAR ENDED DEC. 31ST

	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Total
	Units	Amount	Units	Amount	Units	Amount	Units	Amount	for year
Estimated orders received (Per Figure 27.2A)									
Product A	20,000	$60,000	25,000	$75,000	30,000	$90,000	25,000	$ 75,000	
Product B	50	25,000	..	..	10	5,000	140	70,000	
		$85,000		$75,000		$95,000		$145,000	$400,000
Estimated manufacturing cost (Per Figure 27.2C)									
Product A		40,000		50,000		60,000		50,000	
Product B		15,000		..		3,000		42,000	
		$55,000		$50,000		$63,000		$92,000	$260,000
Commercial and administrative expense for volume of orders[a]		$17,500		$17,500		$17,500		$18,750	$ 71,250
Analysis of charges									
Salary payroll		$10,700		$10,700		$10,700		$11,450	$ 43,550
Traveling and entertaining		2,875		2,875		2,875		3,000	11,625
Rent		2,500		2,500		2,500		2,500	10,000
Other expense		1,425		1,425		1,425		1,800	6,075
		$17,500		$17,500		$17,500		$18,750	$ 71,250

[a]By reference to Figure 27.2G, the commercial and administrative expense for the manufacturing cost of the estimated annual rate of orders received may be ascertained.

Figure 27.2F

COMPANY X

ESTIMATED COMMERCIAL AND ADMINISTRATIVE EXPENSE PER ANNUM

Manufacturing cost—orders received per annum

	$125,000-$225,000		$225,000-$300,000		$300,000-$450,000		$450,000	
	No. emp.	*Amount*	*No. emp.*	*Amount*	*No. emp.*	*Amount*	*No. emp.*	*Amount*
Commercial expense								
Salaries:								
Sales manager	1	$ 5,000	1	$ 5,000	1	$ 5,000	1	$ 5,000
Salesmen	3	9,000	4	12,000	5	15,000	7	21,000
Clerical	4	4,800	5	5,800	5	5,800	6	7,000
Other expenses:								
Traveling and entertainng		7,500		10,000		10,000		14,000
Rent		6,000		6,000		6,000		6,000
All other expense		2,700		3,200		3,200		4,000
Total commercial expense		$35,000		$42,000		$45,000		$57,000
Administrative expense								
Salaries:								
Executive officers	3	$12,500	3	$12,500	3	$12,500	3	$12,500
Clerical	5	5,500	6	7,500	6	7,500	7	8,500
Other expenses:								
Traveling and entertaining		1,000		1,500		2,000		2,000
Rent		4,000		4,000		4,000		4,000
All other expense		2,000		2,500		4,000		6,000
Total administrative expense		$25,000		$28,000		$30,000		$33,000
Total		$60,000		$70,000		$75,000		$90,000
Ratio to manufacturing cost of orders received		48%		31%		25%		20% 27%

Figure 27.2G — Average ratio

COMPANY X

PROJECTED CASH RECEIPTS AND DISBURSEMENTS—YEAR ENDED DEC. 31ST

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total for year
Cash balance beginning of period	$ 20,000	$ 26,475	$ 19,150	$ 20,100	$ 20,000
Receipts, exclusive of notes payable (Per Figure 27.3A)	103,400	89,750	85,250	102,750	381,150
	123,400	116,225	104,400	122,850	401,150
Disbursements, exclusive of notes payable (Per Figure 27.3B)	86,625	86,925	94,000	99,250	366,800
	36,775	29,300	10,400	23,600	34,350
Notes payable:					
Disbursements—Principal	30,000	20,000	10,000	20,000	80,000
—Interest, renewal	300	150	300	300	1,050
	6,475	9,150	100	3,300	-46,700
Receipts	20,000	10,000	20,000	20,000	70,000
Cash balance at end of period	$ 26,475	$ 19,150	$ 20,100	$ 23,300	$ 23,300

Figure 27.3

COMPANY X

PROJECTED CASH RECEIPTS—YEAR ENDED DEC. 31ST

COMPANY X

PROJECTED CASH RECEIPTS—YEAR ENDED DEC. 31ST

		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Balance at end of period
Customers' accounts beginning of period:						
Current	$ 45,000	$ 40,000	$ 5,000			
Past due	5,000	1,000	1,500			$ 2,500
	$ 50,000					
Estimated sales billed: (Per Figure 27.2A)						
Product A—1st Quarter	$ 60,000	45,000	13,000	$ 2,000		
2nd "	75,000		50,000	22,000	$ 3,000	
3rd "	75,000			50,000	22,000	3,000
4th "	75,000				50,000	25,000
	$285,000					
Product B—1st Quarter	$ 21,000	14,000	5,000	2,000		
2nd "	19,000		12,000	5,000	2,000	
3rd "	5,000			2,000	2,000	1,000
4th "	40,000				20,000	20,000
	$ 85,000					
Total	$420,000	100,000	86,500	83,000	99,000	$51,500
Cash discounts allowed		600	750	750	750	
		99,400	85,750	82,250	98,250	
Sundry debtors balance	$ 5,000					
Sales of scrap	15,500					
	$ 20,500	4,000	4,000	3,000	4,500	$ 5,000
		$103,400	$89,750	$85,250	$102,750	
Total customers' accounts	$420,000					
Balance at end of period	51,500					
Gross receipts	368,500					
Cash discounts	2,850					
Net receipts	$365,650					

Figure 27.3A

COMPANY X

PROJECTED CASH DISBURSEMENTS—YEAR ENDED DEC. 31ST

	1st Quarter	*2nd Quarter*	*3rd Quarter*	*4th Quarter*	*Total*
Accounts payable (Per Figure 27.3C)	$80,625	$80,925	$88,000	$93,250	$342,800
Dividends	6,000	6,000	6,000	6,000	24,000
Total	$86,625	$86,925	$94,000	$99,250	$366,800

Figure 27.3B

COMPANY X

PROJECTED ACCOUNTS PAYABLE DISBURSEMENTS—YEAR ENDED DEC. 31ST

COMPANY X

PROJECTED ACCOUNTS PAYABLE DISBURSEMENTS—YEAR ENDED DEC. 31ST

	Total	1st Quarter Accrual	1st Quarter Disbursements	2nd Quarter Accrual	2nd Quarter Disbursements	3rd Quarter Accrual	3rd Quarter Disbursements	4th Quarter Accrual	4th Quarter Disbursements	Accounts Payable at end of period
Balance beginning of period.	$ 20,000		$20,000							
Material and supply purchases (Per Figure 27.3D)										
1st Quarter	$ 30,325	$30,325	$20,000		$10,325					
2nd "	36,500			$36,500	24,000		$12,500			
3rd "	40,500					$40,500	25,000		$15,500	
4th "	41,000							$41,000	30,000	$11,000
	$148,325									
Direct labor payroll (Per Figure 27.3D)	$ 65,500	15,000	13,800	16,500	16,200	16,500	16,500	16,500	16,500	1,500
Factory overhead (Per Figure 27.3E)										
Salary payroll	$ 9,500	2,375	2,375	2,375	2,375	2,375	2,375	2,375	2,375	
Shop payroll	15,000	3,525	3,250	3,825	3,800	3,825	3,825	3,825	3,825	300
Other expense and power, heat and light	18,625	4,225	4,000	4,800	4,225	4,800	4,800	4,800	4,800	800
	$ 43,125									
Taxes and insurance	$ 5,000					5,000	5,000			
Commercial and administrative expense (Per Figure 27.2F)										
Salary payroll	43,550	10,700	10,700	10,700	10,700	10,700	10,700	11,450	11,450	
Traveling and entertaining and other expense	17,700	4,300	4,000	4,300	4,300	4,300	4,300	4,800	4,300	800
	61,250									
Rent	10,000	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	
Manufacturing plant	10,000	2,500		500	2,500	2,000	500	5,000	2,000	5,000
	$362,200	$75,450	$80,625	$82,000	$80,925	$92,500	$88,000	$92,250	$93,250	$19,400

Figure 27.3C

COMPANY X

PROJECTED REQUIREMENTS RAW MATERIAL AND SUPPLIES AND DIRECT LABOR—YEAR ENDED DEC. 31ST

	1st Quarter		2nd Quarter		3rd Quarter		4th Quarter		Total	
	Material	*Labor*	*Material*	*Labor*	*Material*	*Labor*	*Material*	*Labor*	*Material*	*Total*
Product A										
Inventory beginning of period:										
10,000 units—finished—$2.00—$20,000										
15,000 " —80% fin. 24,000										
Raw materials..... 26,000										
Proposed production:										
Estimated shipments / *Production fin. units*										
1st Quar. 20,000 / 22,000	$22,000	$11,000								
2nd " 25,000 / 25,000			$25,000	$12,500						
3rd " 25,000 / 25,000					$27,500	$12,500				
4th " 25,000 / 25,000							$27,500	$12,500		
85,000 / 87,000										
Product B										
20 units—finished—$300—..... $6,000										
30 " —80% fin..... 7,200										
Raw materials ..... 6,800 (Reduce to equivalent of 30 units)	2,800 (Cr.)		1,000 (Cr.)							
Proposed production:										
Estimated shipments / *Production fin. units*										
1st Quar... 50 / 50	5,000	4,000								
2nd " .. 40 / 50			5,000	4,000						
3rd " .. 10 / 50					5,500	4,000				
4th " .. 80 / 50							5,500	4,000		
180 / 200										
Salvage value defective work (Excess of cost over this value included above. Costs include *last* value of scrap material, but not salvage value)	3,000		4,000		4,000		4,500			
Supplies 10,000										
Product A (stores).....	2,000		2,375		2,375		2,375			
" B ..... (Per Figure 27.3E)	1,125		1,125		1,125		1,125			
Total requirements	$30,325	$15,000	$36,600	$16,500	$40,500	$16,500	$41,000	$16,500	$148,325	$64,500
Total inventory $100,000										

Figure 27.3D

COMPANY X

PROJECTED FACTORY OVERHEAD—YEAR ENDED DEC. 31ST

Total inventory $100,000

Figure 27.3D

COMPANY X

PROJECTED FACTORY OVERHEAD—YEAR ENDED DEC. 31ST

		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total for year
Product A						
Direct labor—proposed production (Per Figure 27.3D)		$11,000	$12,500	$12,500	$12,500	$48,500
Total factory overhead for proposed volume of production[a]		$11,250	$12,500	$12,500	$12,500	$48,750
Analysis of overhead charges						
Salary payroll	(a)	$ 1,375	$ 1,375	$ 1,375	$ 1,375	$ 5,500
Shop payroll	(b)	2,075	2,375	2,375	2,375	9,200
Supplies (Thru stores)	(c)	2,000	2,375	2,375	2,375	9,125
Other expense	(d)	800	1,125	1,125	1,125	4,175
Power, heat and light	(e)	1,750	2,000	2,000	2,000	7,750
Depreciation	(f)	2,500	2,500	2,500	2,500	10,000
Taxes and insurance	(g)	750	750	750	750	3,000
		$11,250	$12,500	$12,500	$12,500	$48,750
Product B						
Direct labor—proposed production (Per Figure 27.3D)		$ 4,000	$ 4,000	$ 4,000	$ 4,000	$16,000
Total factory overhead for proposed volume of production[a]		$ 8,250	$ 8,250	$ 8,250	$ 8,250	$33,000
Analysis of overhead charges						
Salary payroll	(a)	$ 1,000				$ 4,000
Shop payroll	(b)	1,450				5,800
Supplies (Thru stores)	(c)	1,125				4,500
Other expense	(d)	675	SAME THROUGHOUT			2,700
Power, heat and light	(e)	1,000				4,000
Depreciation	(f)	2,500				10,000
Taxes and insurance	(g)	500				2,000
		$ 8,250				$33,000

[a]By reference to Figures 27.2D, and 27.2E, the factory overhead for the estimated annual rates of direct labor expenditures may be ascertained.

Alphabetical references appearing in analyses, group expenses per Figures 27.2D and 27.2E.

Figure 27.3E

COMPANY X

PROJECTED BALANCE SHEET—DEC. 31ST

	Balance Sheet Jan. 1st	*Transactions during year (Per Figure 27.4A)* Dr.	Cr.	*Projected Balance Sheet Dec. 31st*
Assets:				
Manufacturing plant	$250,000	$ 10,000	$ 0	$260,000
Less: Reserve for normal depreciation	50,000	0	20,000	70,000
	$200,000			$190,000
Merchandise inventories	$100,000	$ 280,950	$ 274,650	$106,300
Customers' accounts	50,000	370,000	368,500	51,500
Sundry debtors	5,000	15,500	15,500	5,000
Cash	20,000	451,150	447,850	23,300
Total current assets	$175,000			$186,100
Prepaid rent	$20,000	$ 10,000	$ 10,000	$ 20,000
Prepaid taxes and insurance	5,000	5,000	5,000	5,000
Unliquidated factory overhead	0	9,250	0	9,250
Total	$400,000	$1,151,850	$1,141,500	$410,350
Liabilities:				
Notes payable	$30,000	$ 50,000	$ 40,000	$ 20,000
Accounts payable	20,000	342,800	347,600	24,800
Total current liabilities	$50,000			$44,800
Capital stock	300,000			300,000
Surplus	50,000	354,450	370,000	65,550
Total	$400,000	$ 447,250	$ 457,600	$410,350
Unfilled orders	$50,000			$80,000

Figure 27.4

COMPANY X

PROJECTED FINANCIAL TRANSACTIONS—YEAR ENDED DEC. 31ST

Reserve for Manufac-

COMPANY X

PROJECTED FINANCIAL TRANSACTIONS—YEAR ENDED DEC. 31ST

Transaction	Figure	Manufacturing plant Dr.	Reserve for depreciation Cr.	Merchandise inventories Dr.	Merchandise inventories Cr.	Customers' Accounts Dr.	Customers' Accounts Cr.	Sundry debtors Dr.	Sundry debtors Cr.	Cash Dr.	Cash Cr.
Gross sales billed	27.2					$370,000					
Cost of sales billed	"				$249,000						
Notes payable	27.3									$ 70,000	$ 80,000
Interest paid	"										1,050
Customers' accounts—Receipts	27.3A						$365,650			365,650	
Cash discounts allowed	"						2,850				
Sales of scrap	"				15,000			$ 15,500			
Sundry debtors—Receipts	"								$ 15,500	15,500	
Accounts payable—Disbursements	27.3B										342,800
Dividends	"										24,000
Accounts payable—Accruals	27.3C										
Material and supplies	"			$148,325							
Direct labor	"			64,500							
Factory overhead	"			43,125							
Manufacturing plant	"	$10,000									
Depreciation	27.3E		$20,000	20,000							
Taxes and insurance	"			5,000							
Unliquidated factory overhead	27.4B				9,250						
		$10,000	$20,000	$280,950	$274,650	$370,000	$368,500	$ 15,500	$ 15,500	$451,150	$447,850

Transaction	Figure	Prepaid rent Dr.	Prepaid rent Cr.	Prepaid taxes and insurance Dr.	Prepaid taxes and insurance Cr.	Notes payable Dr.	Notes payable Cr.	Accounts payable Dr.	Accounts payable Cr.	Profit and loss and surplus Dr.	Profit and loss and surplus Cr.
Gross sales billed	27.2										$370,000
Cost of sales billed	"									$249,900	
Federal taxes accrued	"								$ 5,400	5,400	
Notes payable	27.3					$ 50,000	$ 40,000				
Interest paid	"									1,050	
Cost discounts allowed	27.3A									2,850	
Accounts payable—Disbursements	27.3B							$342,800			
Dividends	"									24,000	
Accounts payable—Accruals	27.3C								342,200		
Taxes and insurance	"			$ 5,000							
Commercial and admin. exp.										61,250	
Rent		$10,000									
Taxes and insurance	27.3E				$ 5,000						
Rent charged commercial exp.	27.2F		$10,000							10,000	
		$10,000	$10,000	$ 5,000	$ 5,000	$ 50,000	$ 40,000	$342,800	$347,600	$354,450	$370,000

		Unliquidated factory overhead Dr.	Unliquidated factory overhead Cr.
Unliquidated overhead	27.4B	$ 9,250	

Figure 27.4A

COMPANY X

PROJECTED UNLIQUIDATED FACTORY OVERHEAD

YEAR ENDED DEC. 31ST

Product A		
Total overhead (Per Figure 27.3E)		$48,750
Direct labor	$48,500	
Equivalent overhead at 100% of D.L.		48,500
Unliquidated overhead		$ 250
Product B		
Total overhead (Per Figure 27.3E)		$33,000
Direct labor	$16,000	
Equivalent overhead at 150% of D.L.		24,000
Unliquidated overhead		$ 9,000
Total		$ 9,250

Figure 27.4B

An Adaptation of Mechanical Accounting Control

By
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Milwaukee, Wisconsin

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

The value of useful information to be obtained from the records of a business must always be measured against the cost of securing that information. Much desirable information lies buried and unused simply because the cost of getting it seems prohibitive. Many analyses are not undertaken for the same reason. As business units have increased in size, the need for much information previously deemed unnecessary has become more urgent. Invention once again has been mothered by necessity and methods for reducing the cost of accounting have been devised. Cost reduction in this field has great possibilities—partcularly so, since the means of cost reduction make available data which will usually provide the basis for increased income and decreased costs elsewhere in the organization. We are glad to present in this issue a description of an installation of accounting machinery which has materially reduced the cost of accounting.

The author, L. G. Regner, was graduated from the University of Valparaiso, Valparaiso, Indiana, in 1913, from the College of Business Administration. He spent five years as an acountant with The Milwaukee Electric Railway and Light Company, a subsidiary of the North American Company. During this time he was connected with various divisions of their accounting organization, as well as serving on a committee which had in charge the preparation, installation, and operation of various profit-sharing plans in The North American Company system. He also served with other members of the accounting department in the preparation of a large volume of financial and operating statistical reports used in rate cases before the Wisconsin Railroad Commission.

For the past nine years he has been connected with the accounting department of the Briggs & Stratton Corporation, manufacturers of automotive specialties, gas engines and radio eliminators. At the present time he is General Auditor of the Company.

In addition to his connection with the National Association of Cost Accountants he is a senior member of the Society of Industrial Engineers.

This paper was presented before a recent meeting of the Milwaukee Chapter of which Mr. Regner is a member.

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AN ADAPTATION OF MECHANICAL ACCOUNTING CONTROL

Introduction

CONSIDERABLE interest has been shown of late by executives of this vicinity in the application of accounting machine methods. The present generation will doubtless witness the time when the use of the pen and pencil in business will be confined almost wholly to the writing of signatures and the checking of records. Many executives in business still believe that machines for writing and computing are valuable only in institutions where a large volume of work is the rule.

No other machines are so adjustable as to handle a complete accounting system as effectively and economically as the present type of accounting machines.

Some of the results of machine applications have proven so profitable that the standardization of complete accounting systems has resulted. It takes the drudgery out of the routine of accounting by making the work easy and it combines economy with speed and better records.

In presenting the subject which has been assigned to me, I wish to state at the outset that we do not sponsor any particular company's accounting machine. The procedure to be illustrated is merely our adaptation of accounting machines to our particular problem and cannot be taken in the whole as a possible solution of your problem. Lines of manufacture and individual circumstances must be considered in devising any system of mechanical accounting control.

The subject has been broken up into four divisions each of which treats of a major point of control.

These four points of control are:

1. Accounts Receivable Control.
2. Accounts Payable Control.
3. Pay Roll and Material Control.
4. General Ledger Control.

Each of these points for which a definite system of control must be devised will be taken up and discussed in turn.

ACCOUNTS RECEIVABLE CONTROL

Sales Order

Writing and Distribution. This order is written on a manifold billing machine in ten *clear* copies at one writing. Copies are distributed and placed to the following uses:

1. Customer after shipment has been made (see lower right hand corner of chart, page 223).
2. Billing or Accounting Copy.
3. Shipping Department File Copy (Calendrical).
4. Master Packing List (Accompanies goods).
5. Acknowledgment (Mailed to customer after audit of order).
6. Inventory and Cost Accounting (Numerical).
7. Sales Department Unfilled Record File (Alphabetical).
8. Production (For entering manufacturing order and recording daily deliveries to shipping department).
9. Sales Department (Numerical file).
10. Engineering and District Sales Office Copy (For verification as to part number, and then forwarded to District Sales Office).

The reverse side is used for recording purposes.

It is believed the body of the order is self-explanatory, with the exception of a statement as to the back ordering system which we have adopted. The particular shipment of goods referred to was the first shipment to go forward and the Order No. had the affix, Pro 1. At that time a pro-set was written which would be known as Pro 2, in which the amount ordered less the shipment made on Pro 1 would appear under quantity ordered.

This pro set is written up in six copies, and is intended for the following:

1. Customer's Invoice.
2. Billing or Accounting Copy.
3. Shipping Department File Copy.
4. Inventory and Cost Accounting.
5. Master Packing List (Accompanies goods).
6. Sales Department.

Billing or Accounting Copy

Distribution for Sales and Cost Analysis. After the billing has been completed and various summaries by adding machine tape have been made for use in connection with a daily report, the invoices are posted in the Accounts' Receivable Division (to be explained a little later) and routed to the Tabulating Division.

The key punch operators prepare tabulating card for each invoice by key punching the following data:

1. Part No.
2. Quantity Shipped.
3. Unit Price.
4. Order No.
5. Day of the month.
6. Month of the year.
7. Customer No.
8. General Ledger, Account No.; and finally
9. The Amount of the Invoice.

A debit account key punching is not made for the reason that all sales items are controlled in one account.

Inventory Accounting Copy

Distribution for Cost of Sales Analysis and General Audit Control. This copy serves as a posting medium to the inventory account of the item in question. Upon being priced it is extended and routed to the Tabulating Division.

The key punch operators prepare a requisition for each shipment by key punching 10,* part No.; 11, divisional Cost of Sales account to be charged; 12, finished goods account to be credited; 13, total cost; 14, complement for use in balancing inventory ledgers with general accounting control.

General

At the end of a month the sales tabulating cards, having been balanced daily to the amount of daily shipments, are sorted by account No. 8* for purpose of drawing up the monthly journal voucher of sales. The total must agree with the total control column totals appearing in the control ledger.

*The figures refer to position on key punch card page 222.

The cards are then sorted by customer numbers and part numbers and numerous other sortings, for the purpose of tabulating statistics for sales analysis and for salesmen's compensation calculations.

Tapes are likewise prepared showing invoice No., part No., and amount of both sales and cost for purposes of comparison in detecting any gross variations in costs as compared with sales price.

Orders costed are then checked off the sales tape and all unchecked items appearing on the former should represent "uncosted items" in the inventory accounting department for which an "estimated cost" is set up at end of the month and reversed the beginning of the following month, so as to permit the customary routine to be undisturbed.

Credit Memorandum

At times material is returned for repairs or adjustments. In that case a credit memorandum is prepared crediting the customer's account and charging returns and allowances.

A tabulating card is likewise prepared for credit memos. This is necessary because items of this nature are a part of the sales analysis and journal voucher.

The items appearing on same are explained by reference to the identification numerals as follows:

15. Part No.
16. Quantity.
17. Price.
18. Credit Memo. number.
19 & 20 Date.
21. Customer number.
22. Account number.
23. Complement for use in Tabulating.

Accounts Receivable Ledger Posting and Control Provided

Invoices and Dr. and Cr. Memorandums are sorted alphabetically and posted to customers' ledger sheet and proof sheets in one operation. Note amount of invoice—with identifying mark 9—and amount of credit memo—notation 23.

When a remittance is received, the (24) net amount after discount, the (25) discount, and (26) the gross amount are posted to the customer's account and proof sheet in one operation.

It appears needless to say that this method of bookkeeping lends itself to ready verification for the reason that each proof sheet is self-balancing.

The totals appearing on the proof sheets are entered on the control ledger sheet provided for each ledger. (Refer to identifying numbers 25, 26, 27 and 28.)

Individual ledger balance must agree with the column 29 "balance"; and balances of all ledgers must equal the balance in the general ledger.

An illustration of this may be seen by reference to chart of general ledger control, pages 228 and 229.

The entries on the cash book are made direct from deposit book, providing another means of internal check.

By reference to the lower right hand corner of the chart, page 223, you will find a copy of the invoice directed to the customer and statement of account, and exact copy of the account. By established principles it has been the practice to mail statements the morning of the first.

This has helped us materially in maintaining our uncollectible accounts at a minimum.

You will also find a reproduction of a daily report to treasurer of cash receipts, disbursements, balances and anticipated requirements for a period of ten days. The former data are gathered from the records previously mentioned.

Accounts Payable Control

Requisition for Purchase of Material

Upon receipt of No. 8 copy of the Sales Order by the Production Department a stock check is made, whereupon a requisition for purchase of material is prepared showing:

40. Requisition No.
41. Purchase Order No.
44. Acct. No. to be charged.

The requisition is then directed to the General Manager for approval and to the Purchasing Agent to arrange purchase.

Purchase Order. The purchase order is prepared in four copies, viz.:

1. Original.
2. Purchasing Department Copy.
3. Stock Room Copy.
4. Office Copy.

This form discloses:

40. Requisition Purchase of Material.
41. Purchase Order No.
44. Account No.

and a space for keeping a record of quantity per receiving slips and invoices.

Vendors' Invoice. Upon receipt of vendors' invoices in the mailing department, they are directed to the accounting department for entry and then are sorted alphabetically for posting.

A rubber stamp impression is made on the invoice, with spaces for: (a) Invoice No., (b) Terms, (c) Check No., (d) Purchase Order No., (e) Date, (f) D.M. or C.M., applicable in case of adjustment, (g) Date as to material received, (h) Receiving Slip No., and (i) Acct. No. to be charged.

Each invoice receives a number (42), which is composed of the month of the year (2, in this case), the day (15), and the number of the invoice in the lot. The terms are also entered.

After the invoices have been numbered they are posted to the vendors' invoice and the invoice register in one operation (Note item 46, page 225).

The invoices are then routed to the purchasing department, which makes entry on its copy of the purchase order and inserts:

41. Purchase Order No. and Date.
    The initials of the employee verifying the extension.
44. Account No.

The invoices are then returned to the accounting department for making up the check for payment. However, for purposes of assuring the accounting department that the purchasing department is not withholding any invoices, they are checked off the invoice register. (Note item 46 on the invoice register.)

After this the invoices are directed to the inventory accounting department for matching with the receiving slips. (Note item 55 showing the number and entry on their ledgers.)

If the quantities, etc., agree (41, 43, 44 and 48), the invoices are routed to the tabulating division for key punching a card used for building up the journal voucher distribution and the inventory accounting control scheme.

This ticket is then punched as follows:

42. Invoice Number.
43. Stock Number.
44. Inventory Ledger Account Number.
45. Accounts Payable Account Number.
46. Amount for distribution.
47. Amount for inventory ledger balancing.

A tabulating tape of the tickets is taken which is compared with an adding machine tape of the invoices as they are returned to the accounting department.

The invoices are then checked off the invoice register using a small data stamp. Any unchecked items represent material in transit and must agree with the invoices in hand in the inventory accounting department and with the material in transit account.

Debit Memorandum. At times material received is proven defective and it is necessary to return same to the vendor.

The inspection department advises the purchasing department of the situation, which issues instructions to the claims branch of the accounting department to issue a debit memo, which is subject to the approval of the auditor.

This memo is entered on the vendor's account, and check and the Purchase Ledger Cr. and Dr. Memo Journal notes,

49. Debit Memo No.
53. Amount.

The Dr. Memo. is then directed to the tabulating department which key punches a ticket for distribution of A/P journal voucher and inventory ledger balancing. This ticket (page 224) shows:

49. Dr. Memo. No.
50. Stock No.
51. A/P Acct. No.

52. Inventory Acct. No.
53. Amt. for distribution.
54. Complement for Inventory Ledger balancing.

Receiving Slip and Freight Bill. The receiving slip is prepared in four copies:

1. Original—for office.
2. Inspection.
3. O.K. Inspection.
4. Rejected Inspection.

The quantities appearing on the invoice are tied up with the receiving slip. (Note item 48, page 224.)

Freight bills are paid daily and charged to a clearance account. As the receiving slips are matched, the amount of the transportation charge is entered.

As the invoice is matched up with the receiving slip a ticket is key punched showing:

55. Receiving Slip No.
56. Stock No.
57. Inventory Acct. No.
58. Freight Acct. No.
59. Amt. for distribution.
60. Amt. for inventory ledger balancing.

This automatically clears the freight charge.

General

Check. The check having been prepared to this point, it is now ready for completion. The check number (61), the total amount (62), the discount (63), and the net amount of the check (64) are shown.

This is posted in one operation on the check, vendor's account and cash disbursements journal.

Final Control. The following total entries are made on the purchase control ledger sheet from the various journals:

65. Purchase Invoices.
66. Cash.
67. Discount.
68. Debit Memo.

A tape of the individual ledger accounts should agree with item 69 A, page 225 top.

Check Record. Instead of entering each check separately on the check record, a summary is taken as follows:

66. Net Amount of Checks.
67. Discount.
69. Gross Amount to be credited to Accounts Payable.

PAY ROLL AND INVENTORY CONTROL

Pay Roll

As employees enter the service they are assigned an index number and a departmental clock number shown on the in- and out-clock record. The index number is permanently assigned for the year at hand and is used for tabulating employees' earnings for tax return purposes. Clock numbers may change depending upon the number of times an employee is transferred between the various departments.

In addition to the use of clock cards we have job tickets. (See page 226) showing:

70. Day or Piece Work Code. Male or Female.
71. Operation No.
72. Order No.
73. Department.
74. Account.
75. Clock No.
76. Hours.
77. Amount Paid.
78. Dist. Overhead.

By reference to the tickets you will note we use two kinds of job tickets, one for piece work and the other for day work.

Time tickets are sorted for the purpose of obtaining accounting data for various purposes, some of which are as follows:

PURPOSE	SHOWING
Verify Clock Records	Clock No., Dept. No, Hours, Amount
Piece Work and Day Work Report	Control Acct. No., Dept., Male, Female, Hours, Amount.
Posting to Work in Process	Control Acct. No., Job No. and Line No.
Job Orders	Labor, Overhead Distributed
Journal Voucher	Acct. No., Amount

The insertions on the payroll sheet, on the in- and out-clock card, and on the check show name and clock number.

The entries on the payroll sheet are prepared from the in- and out-clock cards.

The entry covering the amount of the check is prepared from the in- and out-clock card.

The pay roll checks are sorted and listings prepared as follows:

Purpose	Showing	
Balance Pay Roll	Check No.	Amount
Reconciliation of Bank Balance	Check No.	Amount
Income Tax Data to Employees and State and Federal Govt.	Index No.	Amount

Material, Labor and O. H. Distribution

Requisitions are sorted by control account, number, job number, and line number and tabulated.

The totals are posted to the job orders from the listing. (Note 70 and 79.)

Time tickets are sorted and the listing is prepared showing control account number, job and line number. Labor, overhead, and total are posted to the job order. (Note 70, 77 and 78.)

Inventory

A facsimile of our inventory ledger sheet is shown at the top of page 227. Entries are made in pencil. All inventory ledger entries are controlled by the general ledger accounts. Arithmetical discrepancies and differences arising from spot-checking bin counts against inventory ledger amounts are adjusted monthly by a so-called Inventory Ledger Adjustment Journal Voucher. The majority of our stock items are spot-checked ten times per annum.

Inventory ledgers must agree with the general ledger control accounts reflected in the balance sheet.

Balancing

At the beginning of the month *balance cards* are prepared for all ledger sheets, showing stock number and amount.

The tabulating cards used in connection with the accounts payable scheme are:

Accts. Payable—Vendors' Invoice.
Freight Charge.
Accts. Payable—Debit Memo.
Material Requisition.

These are sorted by control account number and stock number and are then tabulated, to produce a listing showing:
Stock No. and Balance.

General Ledger Control

By reference to the chart on pages 228 and 229, you will find a reproduction of the following forms used in connection with the Auditor's Private and General Ledger Control:

1. Journal Voucher
2. Journal Voucher Ticket.
3. General Ledger Sheet.
4. Private Ledger Sheet.
5. Trial Balance.

Journal Voucher

For purposes of illustration, the voucher pertaining to the distribution of sales, returns and allowances is used.

This voucher is prepared from a tabulating machine listing. (Note column, Tabulating Card Totals.) There are shown only a few of the accounts, for example:

Dr. to Accts. Rec. Control Acct.
Cr. to Sales.
Dr. to Returns Acct.

In our business we have twenty standard journal vouchers per month, in effect a summary of distribution of the various trading and profit and loss accounts.

Journal Voucher Ticket

At the beginning of every month two cards are key punched for each general ledger account showing,

1. Acct. No. and Debit Footing both under Debit Column and under Dr. Amount.
2. Acct. No. and Credit Footing under Credit Column and under Cr. Complement Column.

Individual cards are key punched for each item appearing under

the sub-account amount column of the journal voucher. Note 81 for credit item and 82 for debit item.

Cards are tabulated in total and proved against the total appearing in each journal voucher.

General Ledger

All amounts appearing under the column, Sub-Account Amount, are posted to the General Ledger Sales Accounts, which results in sales figures by the various lines of manufacture engaged in by our company.

Private Ledger

Net amounts appearing under Control Account Amounts are posted to the private ledger accounts. (See item 83.)

Trial Balance

After the tickets have been key punched for all items appearing on the journal vouchers, they are sorted with the "footing" tickets by account number and tabulated on a form designed for the purpose.

By reference to the amount shown under the last column (that is, $2,427.84, item 83) it will be noted that it ties up with the same amount on the private ledger account.

The complement $997,572.16 is equivalent to the credit balance $2,427.84.

As previously stated the small amounts used in the charts are for illustrative purposes only and are not indicative of the actual figures applicable to our business.

DISCUSSION

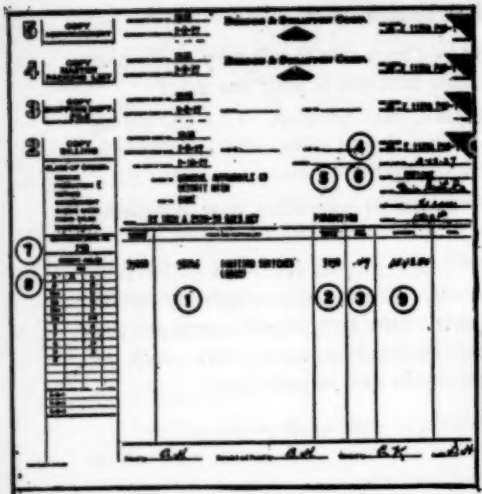
Question: What savings have you been able to effect by application of accounting machine methods in your business?

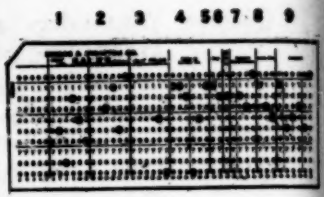
Mr. Regner: I am glad you asked that question. Our accounting expense has been reduced 25%, whereas our volume has increased 200%.

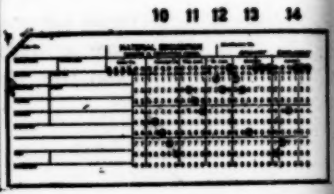
Question: What is the clerical cost of operating your tabulating division?

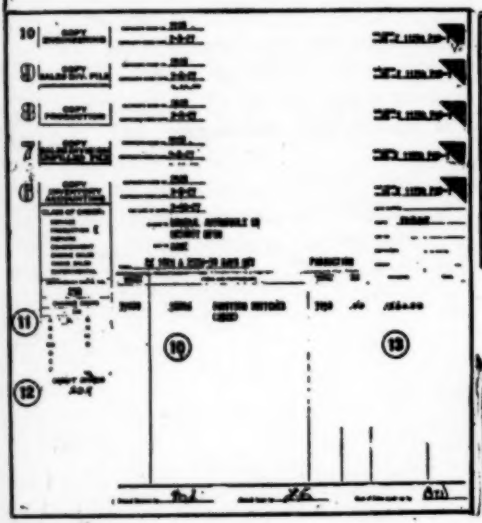
Mr. Regner: The cost is $200 per month for both tabulating and key punching. We use approximately 50,000 cards per month. Our key punch operators are likewise trained to do calculating work, such as extending time cards and requisitions.

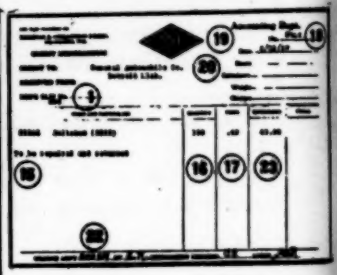
ACCOUNTS RECEIV

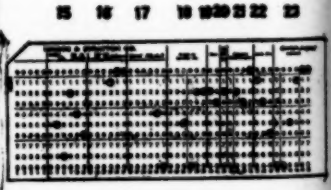




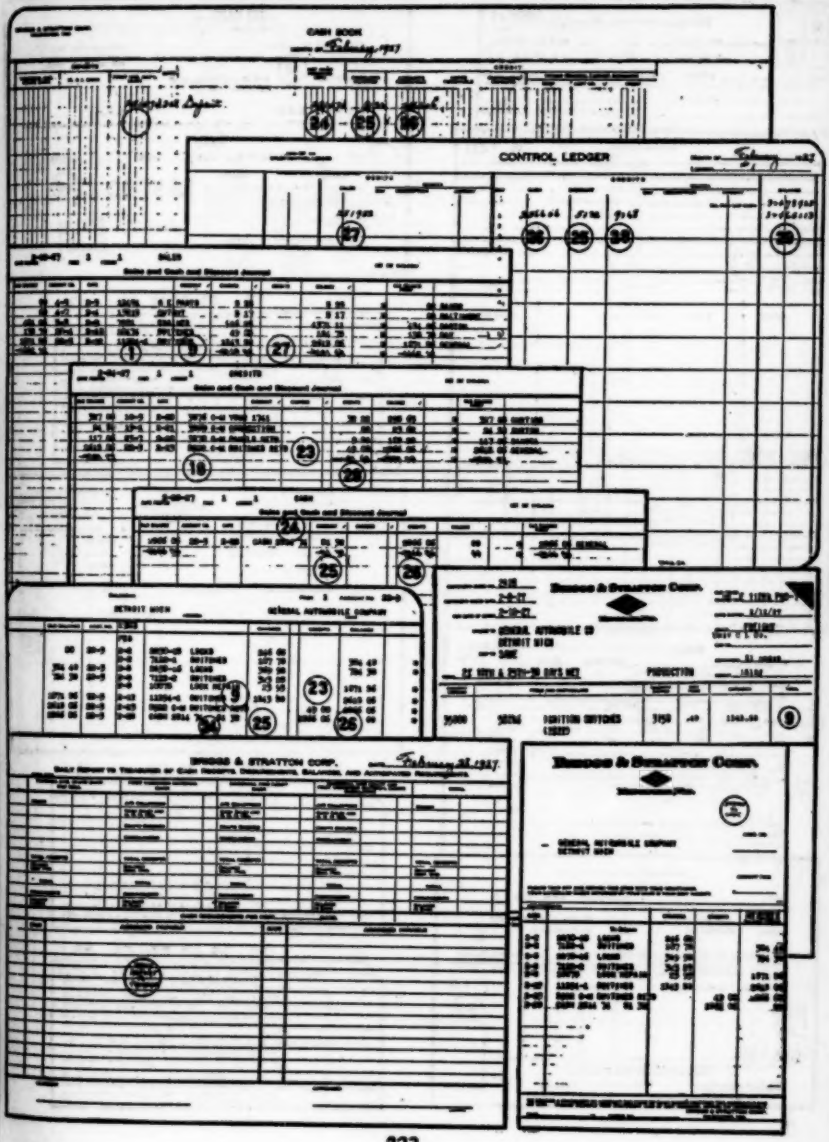




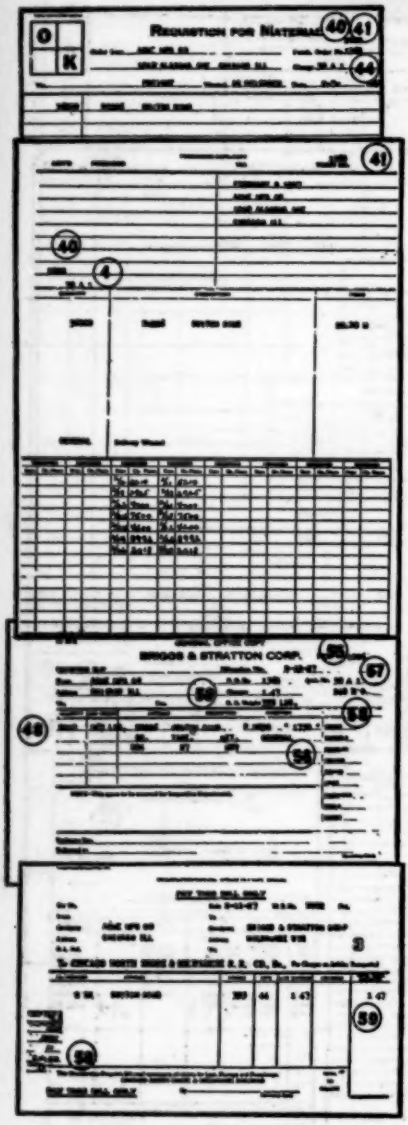


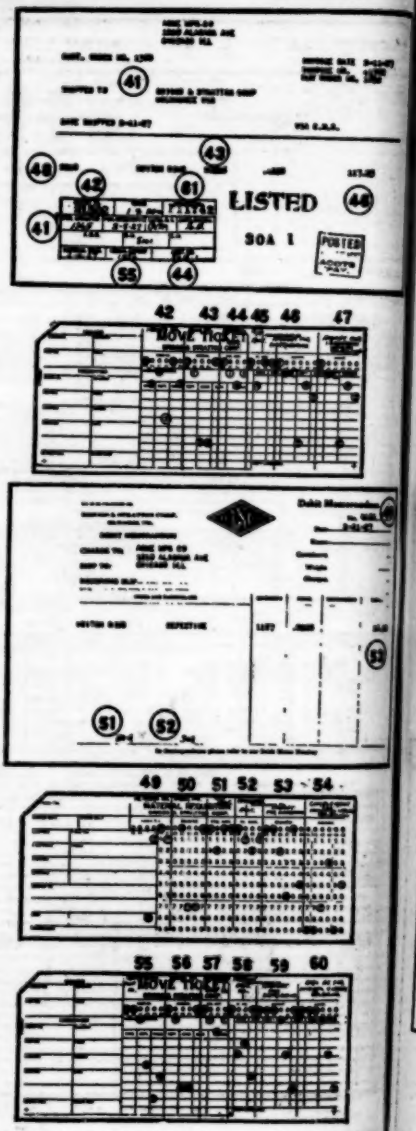


ABLE CONTROL

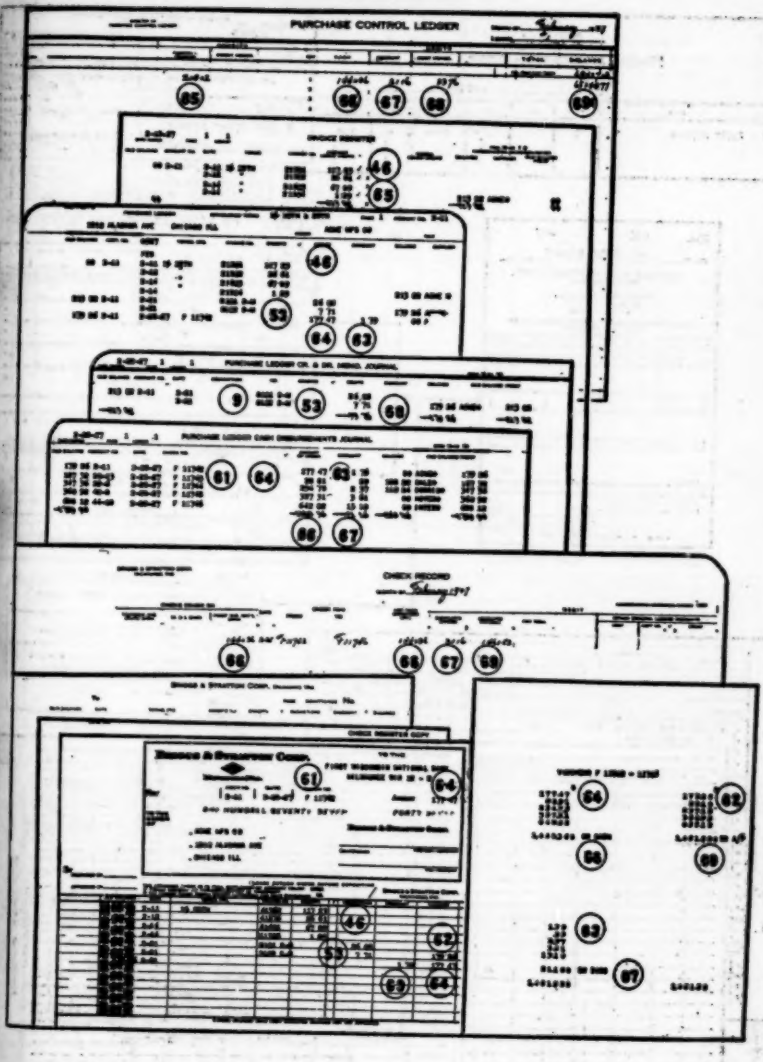


ACCOUNTS PAY

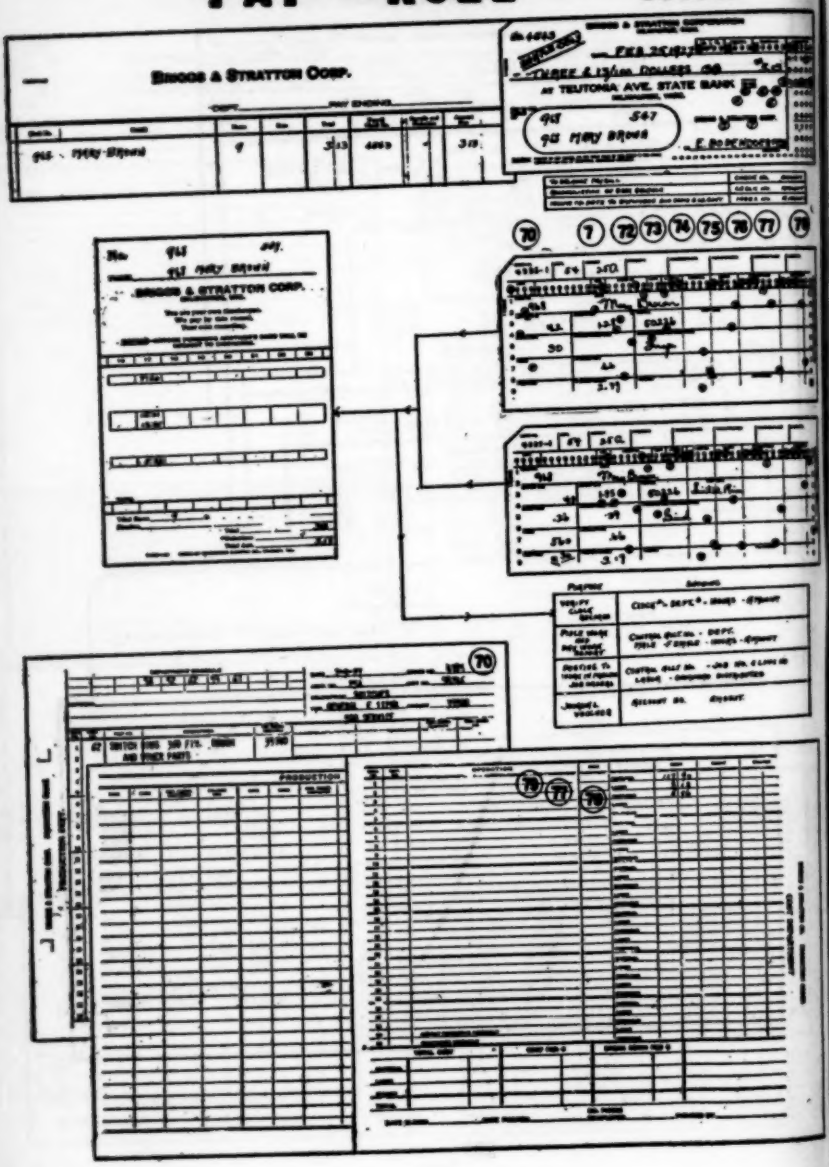




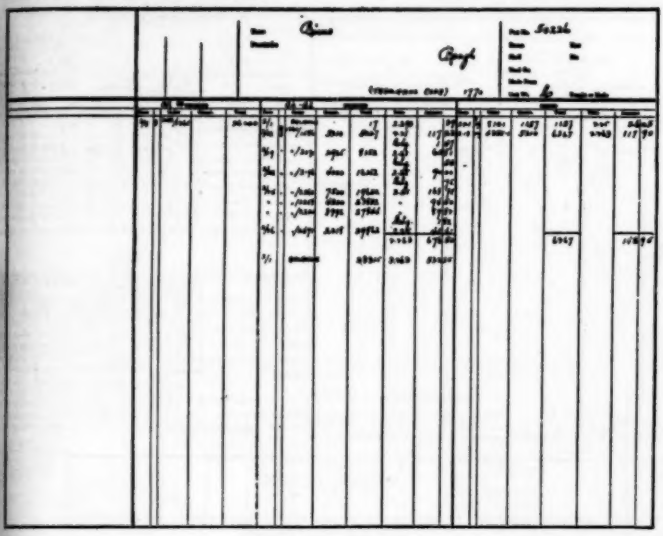
ABLE CONTROL



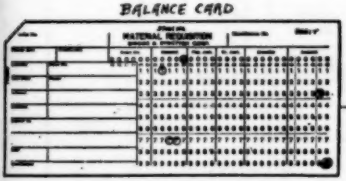
PAY – ROLL AND



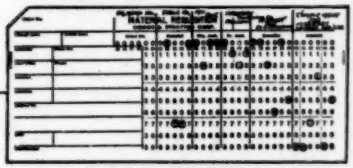
INVENTORY CONTROL



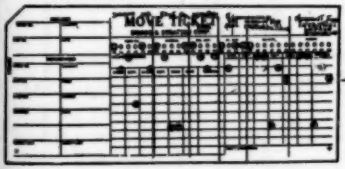
BALANCE CARD



ACCTS. PAYABLE - DEBIT MEMO.



ACCTS. PAYABLE - VENDORS INVOICE



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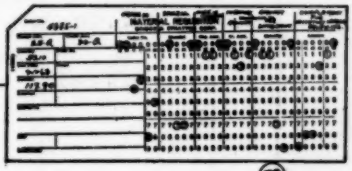
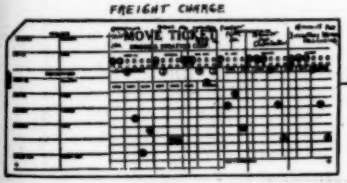
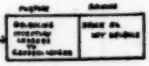


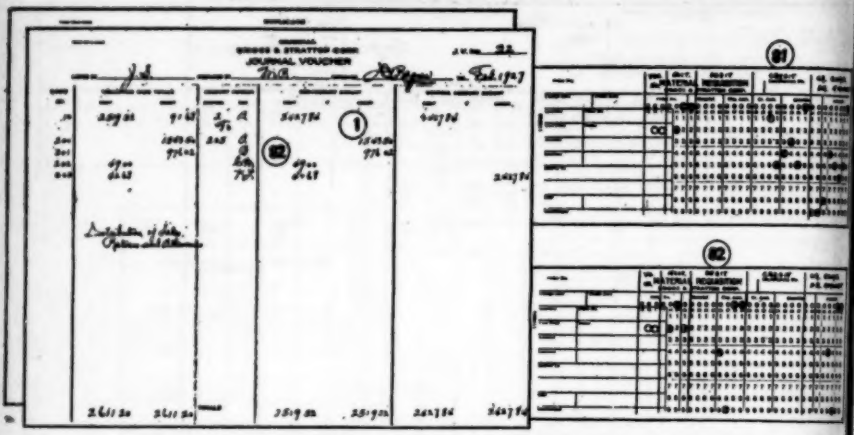
79

FREIGHT CHARGE





GENERAL LEDGER



GENERAL LEDGER

Acct. 2.0. Acct Payable

Fol. 1 Balance 120796

Acct. 205 A - Cultural Specialties - Sales

Fol. 81 By Acct Rec. 22 150350

(81)

Acct. 205 B - Crochet Sales

Fol. 81 By Acct Rec. 22 97622

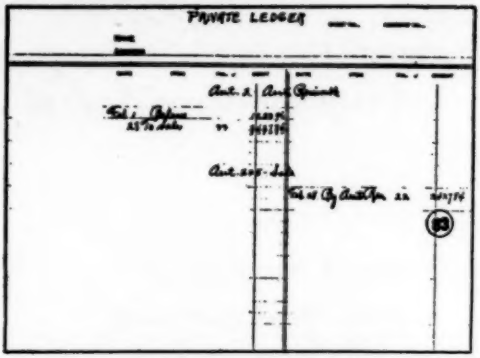
Acct. 205 B/R - Cultural Specialties - Refunds

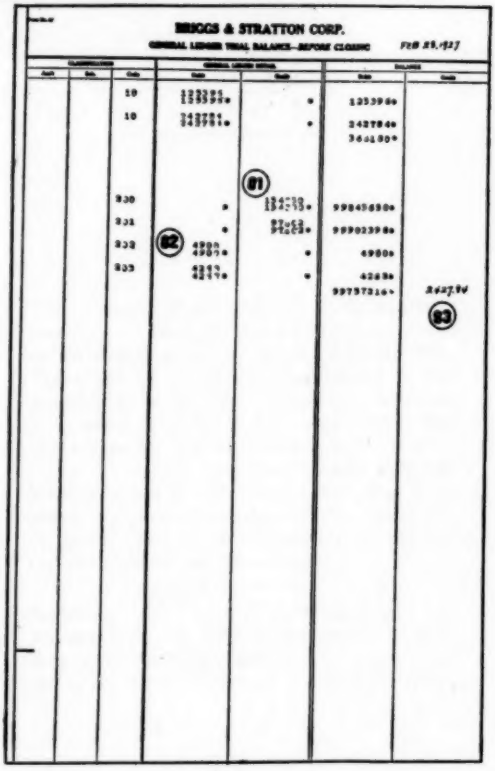
Fol. 82 To Acct Rec. 22 4900 (82)

Acct. 205 TSR - Cultural Specialties Returns

Fol. 82 To Acct Rec. 22 4268

CONTROL


PRIVATE LEDGER


BRIGGS & STRATTON CORP.

GENERAL LEDGER TRIAL BALANCE—BEFORE CLOSING FEB 28,1927

		10			1253946	
		10			2427846	
					3681792	
		830			99845830	
		831			99902386	
		832			49806	
		835			42836	
					99737216	2427.94

Budgetary Control and Standard Costs in the Newsprint Paper Industry

By

G. ANDREW WARE

News Print Service Bureau,
New York, N. Y.

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

Additional copies of this Publication may be obtained from the office of the secretary. The price to members is twenty-five cents per copy and to non-members seventy-five cents per copy.

Vol 9 No 6

EDITORIAL DEPARTMENT NOTE

Increasing consideration is being given to the use and value of standard costs and budgets in the control of business enterprises. Programs and procedures are being developed ahead of the actual introduction of these tools of control in business operation. This evidences a lively interest and a desire to proceed cautiously and to think out beforehand the major problems involved.

In presenting this publication, the author does not offer it as an example of the general practice in the newsprint industry, although many individual concerns have developed quite satisfactory controls. It is suggested, however, as a generally desirable application of budgetary control and standard costs in the industry. The article appeared first as a special publication of the News Print Service Bureau, one of the most progressive of trade service organizations. The reception of the article has been such as to indicate a real interest in the subject and to justify further educational effort along that line.

The author, G. A. Ware, obtained his initial education and experience in accounting with a firm of chartered accountants in England, where he obtained the usual degree of A. C. A. in the English Institute. Since coming to the United States he was on the staff of Price, Waterhouse & Company for eight years and has since been associated with the News Print Service Bureau for the past eight years in the capacity of Assistant Secretary in charge of the accounting work of the organization. The Bureau has conducted general education work for members along accounting, and of course, other lines. Practically all members are now operating a uniform cost accounting system upon the basis of which they are comparing their conversion costs of the different departments. It was necessary, of course, to parallel this accounting work with an engineering service conducted under the supervision of the Bureau.

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COST ACCOUNTANTS
NOVEMBER 15, 1927

BUDGETARY CONTROL AND STANDARD COSTS IN THE NEWSPRINT PAPER INDUSTRY

THE term, Budgetary Control, as used in business differs in meaning from that when applied to municipalities or the financial functions of the Government. In such cases the limits of revenue and expenditure are fixed, but in commercial undertakings the object sought in preparing a budget is more to establish the proportions between revenue and expenditure. Business budgetary control means, therefore, the maintenance of this proportion so that the most profit can be made in the period commensurate with the revenue received. It stands to reason that if through good management sales are increased beyond the original estimate set down in the sales budget, production also must increase with the consequent larger expenditure covering manufacturing costs. It should be the endeavor through budgetary control to see that this expenditure is in proper proportion to the larger income from sales.

Almost every concern has some kind of a budget, the more common, of course, being the financial budget used by the treasurer in anticipating his cash requirements. Much benefit, however, is to be gained by the preparation of a definite and complete budget covering all phases of the business—financial, sales, production and costs—instead of relying on the rather haphazard method of comparing actual results against some mental view at the back of an executive's brain. His ideas on the subject may be perfectly right and it is possible that he may be able to make a good analysis of the results shown to him by the profit and loss account and cost statements.

But how much better it would be if this mental process could be set down in concrete form so that all those responsible for the results might know what is expected of them. This does not mean that results are to be limited to the budget but that the proper proportions must be maintained.

The budget thus becomes the measuring rod for future operations. In any given period sales and production may be above or below the budget and actual costs may vary. An intermediate link is required, therefore, between the budget and the actual results so

that these may be properly measured to find out if they are good, bad, or normal. This link is found in a standard expressed in dollars and cents covering the actual sales and production costs. A standard of this kind shows what the actual production should cost when based directly on the budget, taking into account the budget proportions. The difference between the total amount of this standard cost and the total budget cost is caused wholly by the variation in production.

The standard cost of actual production becomes the real measuring rod for the actual costs. It is concerned more with the quantities and dollar amounts of the items than with the unit costs per ton. Variations are therefore expressed in total amounts and percentages, since a difference of a few cents per ton may mean thousands of dollars in total. These may be all classified under certain definite headings. An executive's time in studying costs may be greatly saved by the preparation of a statement showing why costs have varied, instead of forcing him to wade through voluminous reports of actual costs. He deals with the exceptions and accepts the rest as satisfactory, since it conforms to the standard with which he is familiar. Actual costs are not sacrificed but tend to become more or less incidental if control is maintained over variances. But this standard must be correct in order to be used as an adequate measure of results. For this purpose comparisons of costs with other mills are extremely useful. Reference to a mill's own back records are of course necessary, but it is often found that the results shown in the past are not what they should be in the future when measured against other mills. The conversion cost comparisons conducted through the News Print Service Bureau have this object in view.

With the standards properly set, more benefit is to be gained in centering the data upon variances by causes than by showing only unit costs. The same general principle applies also to the Profit and Loss Account. The exhibition of variances both in dollars and percentages is one of the best methods of maintaining better budgetary control since it shows how the original proportions are either maintained or changed for the better or worse. Instead of being a mere theory, budgetary control thus becomes a practical

aid to the management and there is a better interlocking and harmonizing of all phases of the business.

A set of figures illustrating the method of tracing cost variations back to their causes may be helpful to anyone wishing to delve further into the application of budgetary control. For this purpose a tabulation is given on page 270 showing the cost of three items in the manufacture of newsprint paper: (1) Groundwood Deckered, (2) Labor, (3) Expense, i.e., Depreciation, Taxes, Insurance Manufacturing Burden. The figures, of course, are hypothetical and have been selected to show a plan of tracing variations in any manufacturing cost item coming under the heading of either Material, Labor, or Expense.

The budget figures for any month are shown in the left-hand column. This provides for the manufacture of 2,500 tons of newsprint per month and the three cost items mentioned above are:

Groundwood used	$57,500
Labor	8,750
Expense	10,000

The budget is not changed during the year and becomes the basis for measuring the results shown in the five months from August to December. A series of months has been chosen to illustrate a trend and the benefit to be obtained in keeping track of the cost variances over a period of time all of which are measured from the same base. In certain cases it may be beneficial to chart some of the more important variances. Two examples for this purpose are given in Exhibits 1 and 2, pages 272 and 274.

In order to trace the variances back to their causes it is necessary to show: (1) quantities of material used; (2) man hours of labor expended; and (3) operating machine hours, in addition to the total dollar amounts and tons of newsprint produced. It is not essential to show the prices of materials used or average labor rates per hour. When, however, these can be conveniently given it facilitates somewhat the process of figuring the variances in dollars.

A summary is given on page 271 of the variances for the month of August, and since those for the other months are figured in the same way, they are not shown separately, with the exception of the output effectiveness and labor usage shown on the charts referred to.

Items	Budget	Actual				
Newsprint	2,500 T.	Aug. 3,000 T.	Sept. 2,800 T.	Oct. 2,450 T.	Nov. 2,250 T.	Dec. 2,000 T.
Groundwood Deckered						
Quantity	2,000 T.	2,460 T.	2,240 T.	2,009 T.	1,890 T.	1,640 T.
Price	$28.75	$27.50	$28.00	$28.75	$29.00	$29.50
Cost						
Amount	$57,500.00	$67,650.00	$62,720.00	$57,759.00	$54,810.00	$48,380.00
Per Ton	$23.00	$22.55	$22.40	$23.55	$24.36	$24.19
Labor						
Quantity	10,000 Hr.	12,750 Hr.	11,450 Hr.	11,400 Hr.	10,125 Hr.	9,000 Hr.
Ave. Rate per Hr.	87½¢	87¢	87½¢	82.74¢	84¢	85¢
Cost						
Amount	$8,750.00	$11,092.50	$10,018.75	$9,432.50	$8,505.00	$7,650.00
Per Ton	$3.50	$3.70	$3.58	$3.85	$3.78	$3.82
Expense (Depreciation, Taxes, Insurance and Mfg. Burden)						
Machine Hours	1,200	1,260	1,248	1,224	1,200	1,152
Cost						
Amount	$10,000.00	$10,200.00	$9,912.00	$10,094.00	$10,125.00	$10,100.00
Per Ton	$4.00	$3.40	$3.53	$4.12	$4.50	$5.05

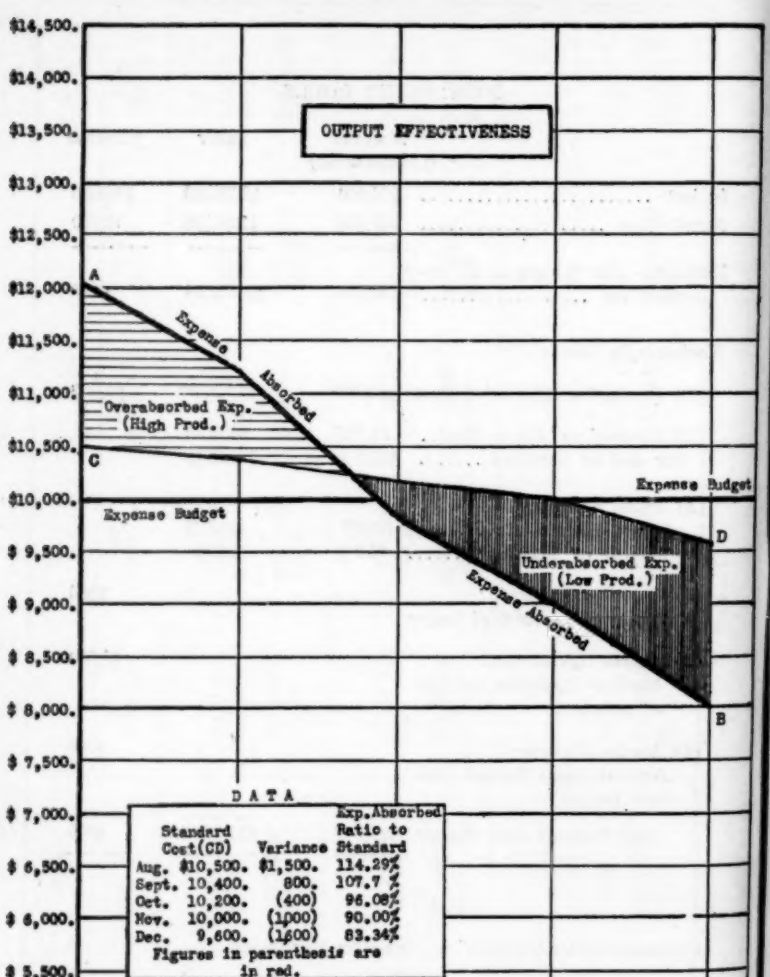
TABLE 1.

NEWSPRINT ROLLS

	Material (Groundwood)	Labor	Expense
Budget	$57,500	$8,750.00	$10,000
Actual Cost	67,650	11,092.50	10,200
Difference over Budget to be Accounted for	*$10,150*	*$2,342.50*	*$200*
Variances by Causes			
(1) *Production* 120% of Budget	*$11,500*	*$1,750.00*	*$2,000*
(2) *Material or Labor Used*..	*$1,725*	*$656.25*	
Per cent of Standard.....	102.5%	106.25%	
(3) *Prices or Rates* below Budget	$3,075	$63.75	
Percent of Standard.....	95.7%	99.5%	
(4) *Capacity Operated* Machine Hrs. 105% of Budget			$500
(5) *Output Effectiveness* Machine Operation 114.29% of Standard			$1,500
(6) *Burden Variance* Amount spent beyond normal Budget			*$200*
Net Variance over Budget	*$10,150*	*$2,342.50*	*$200*

TABLE 2.

Figures in italics are "red," *i.e.*, increases over budget.



DATA

	Standard Cost(CD)	Variance	Exp.Absorbed Ratio to Standard
Aug.	$10,500.	$1,500.	114.29%
Sept.	10,400.	800.	107.7 %
Oct.	10,200.	(400)	96.08%
Nov.	10,000.	(1000)	90.00%
Dec.	9,600.	(1600)	83.34%

Figures in parenthesis are in red.

EXHIBIT I

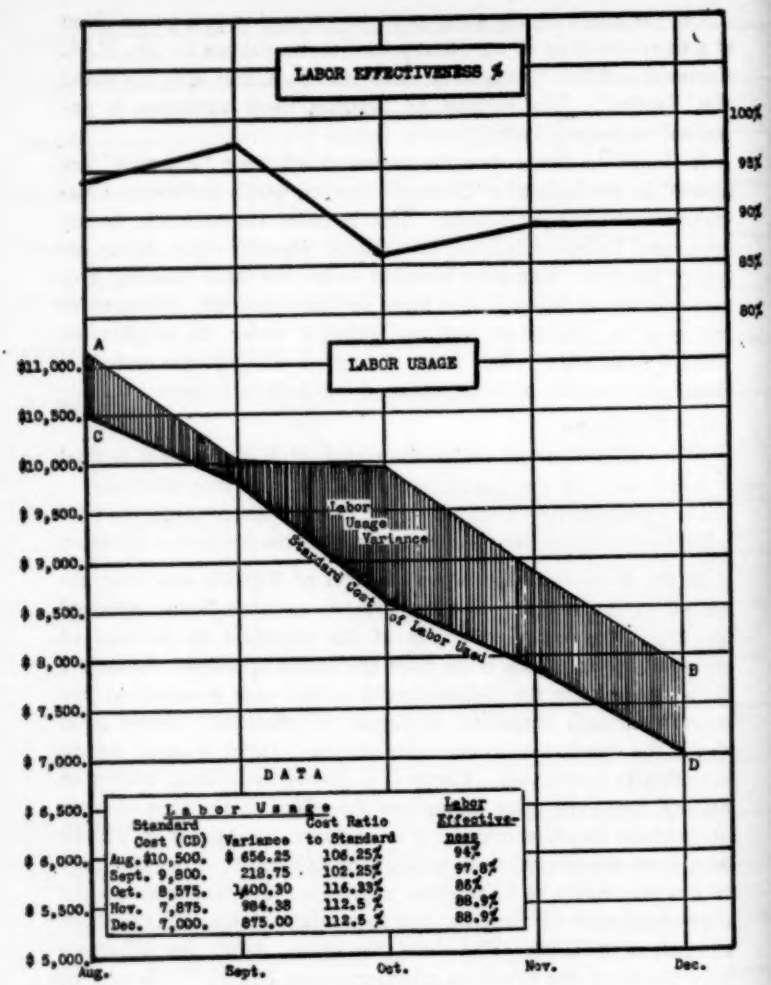
The variances are the same as those referred to in a paper given at a recent meeting of the Newsprint Service Bureau by Mr. E. A. Camman entitled "Budgetary Analysis of Actual and Expected Net Profits." The method of figuring these variances is explained on pages 276-277.

It should be noted that the variances affecting "Expense" are figured on the basis of a "Normal" burden, which in the case illustrated is $10,000 per month. This includes Depreciation, Insurance, and Taxes—which do not change monthly—and Manufacturing Burden. Expenses included under the latter heading may vary slightly each month but these variances are not influenced in any way by production and are included under the heading of Burden Variances. The fixed charge of $10,000 per month is therefore traceable to three causes of variance as follows:

1. Production
   The over- or under-absorption of Expense at a normal rate per ton due to increase or decrease in production.
2. The Capacity Operated } These two variances taken together
3. Output Effectiveness } always offset the production variance.

In the illustration the normal budget of $10,000 was over absorbed in August due to the increased machine hours operated and the increased effectiveness of the machines on account of speeding up or causes other than the hours operated. Exhibit 1 shows graphically the dollars gained or lost over a period of five months through variations in output effectiveness. Curve A B shows the expense over- or under-absorbed (total dollars) due to variation in production. Curve C D shows the normal budget of $10,000 corrected after taking out the effect of the time element or machine hours operated. For instance, in August it will be seen from the tabulation above that the expense absorbed due only to machine hours is $500 above normal, or $10,500, whereas the over-absorption of Expense due to production was $2,000 above normal, or $12,000. The chart, therefore, shows the difference over-absorbed due to output effectiveness of $1,500 which may be read directly from points A and C. In August and September the plant was operating satisfactorily above normal with money being saved due to good running conditions.

In October, November and December, however, operations were



DATA

Labor Usage				Labor Effectiveness
	Standard Cost (CD)	Variance	Cost Ratio to Standard	
Aug.	$10,500.	$ 656.25	106.25%	94%
Sept.	9,800.	218.75	102.25%	97.8%
Oct.	8,575.	1400.30	116.33%	86%
Nov.	7,875.	984.38	112.5 %	88.9%
Dec.	7,000.	875.00	112.5 %	88.9%

EXHIBIT 2

not so good, and through slowing down of machines or some other cause not due to the time operated, production went down. The overhead expense remained stationary as indicated by curve C D, and therefore the chart shows the loss gradually increasing to the end of the year at points D and B.

Exhibit 2 shows graphically a comparison of the cost of the labor used in newsprint against the standard cost for the production actually made. Changes in labor rates are eliminated from this chart. Curve C D is the standard labor cost (total dollars) and has a downward trend due to steadily decreasing production. The curve A B shows the cost of labor actually used after eliminating changes in rates. Since all of the shaded area is above the standard cost line, it is evident that the plant is losing money due to the fact that the effectiveness of labor does not measure up to the standard set by the budget. It should be noted here that the budget does not set an ideal standard impossible for the men to attain, but rather a reasonable expectancy based on experience. In September labor effectiveness stood at 97.8%, the highest point reached in the five months' period. Hence the shaded area is the narrowest. The upper curve on the chart shows the labor effectiveness in per cent explained further on page 276. As this curve goes down, proportionately more money is lost, as is indicated by the broadening tendency of the shaded area shown lower in the chart in the month of October.

The two charts are a suggestive means of quickly calling attention to the results of the operation in dollars and cents. Other charts may also be found useful in individual cases.

The question may be raised as to whether such a system of control is necessary in a single product mill, making principally newsprint paper where it is claimed that the unit costs change but slightly from month to month. It is believed that such a system would be distinctly useful. Operations in their many ramifications do not go right all the time, however sanguine one may be. Eternal watchfulness is required that nothing does go wrong, and a statement of variances has the effect of calling attention to anything out of line, much more definitely and often more quickly than do unit cost statements by themselves. The necessary action to correct the cause may thus be taken sooner than otherwise and money saved accordingly.

METHOD OF FIGURING VARIANCES

1. Production

The tonnage produced in August (3,000 tons) was 120% of the budget (2,500 tons). 20% in excess of groundwood budget $57,500 = $11,500.

The items, Labor and Expense are figured in the same way.

2. Material or Labor Used

According to the budget 2,500 tons of newsprint requires 2,000 tons of groundwood or 2,400 tons to make 3,000 tons of newsprint. This represents a standard cost of $69,000 or the production ratio of 120% x $57,500. But 2,460 tons were actually used which equals 102.5% of the standard quantity, an increase of 2½%. Standard cost is $69,000 of which 2½% is $1,725. This calculation may be reduced to two simple formulae, as follows:

Usage Ratio:—

$$(1)\quad \frac{\text{Actual Quantity (2,460 T.)}}{\text{Budget Quantity (2,000 T.)}} \div \frac{\text{Actual Newsprint Prod. (3,000 T.)}}{\text{Budget Newsprint Prod. (2,500 T.)}}$$

Usage Amount Variance:—

(2) (Usage Ratio less 100) x Standard Dollars
102.5% — 100 = 2.5% x $69,000. = $1,725.
Here Standard dollars = budget amount x % of Actual production to budget.

The variance in labor used is figured in the same manner by substituting "Man hours" for "quantities."

3. Labor Effectiveness Ratio

100 ÷ labor usage ratio to standard. In August, labor used was 106.25% of standard. Since the standard must be 100%, the effectiveness was 94%.

4. Price or Rate Variance

The amount of the material price or labor rate variance may be figured directly from the variation in the actual price or

rate from the budget when this is available. Thus; Groundwood used was 2,460 tons at $1.25 per ton = Variance, $3.075. (The $1.25 rate per ton is the difference between budget price $28.75 and $27.50, the actual price).

If there is any difficulty in obtaining information on prices the following formulae may be easily applied:

Price Ratio:

$$\frac{\text{Actual Dollars (\$67,650)}}{\text{Standard Dollars (\$69,000)}} \div \text{Usage ratio* (102.5\%)} = \text{Price Ratio (95.7\%)}$$

Price Amount Variance:

Usage Ratio (102.5%) × Standard dollars ($69,000) — actual dollars ($67,650) = $3,075

This is the same as taking the difference between the price ratio 95.7% and 100 equals 4.3% multiplied by the total dollars (102.5% of $69,000). Allowance must be made for fractional differences.

5. Capacity Operated

$$\frac{\text{Actual Machine Hours (1,260)}}{\text{Budget Machine Hours (1,200)}} = \text{Capacity Operated Ratio (105\%)}$$

5% of Budget Expense, $10,000 = $500

6. Output Effectiveness

$$\frac{\text{Production \% to Budget (120\%)}}{\text{Capacity Operated (105\%)}} = \text{Output Effectiveness Ratio (114.29\%)}$$

The explanation of this ratio is that production of newsprint was 120% of the budget in 105% of the time. The variance in amount is figured as follows:

Capacity Operated Ratio (105%) × Budget Expense ($10,000) × 14.29%.

7. Burden Variance

This is simply the difference between the normal budget of $10,000 and the actual amount spent in the month. With the exception of Burden Variance, the other variances affecting fixed charges are all based on the normal budget.

* See formula under item 2 above.

Some Phases of Railroad Accounting

By

LEWIS A. BELL,

Nickel Plate Railroad Co.,

Cleveland, Ohio

and

Some Phases of Vessel Accounting

By

R. A. BLOOD,

Pickands, Mather & Company,

Cleveland, Ohio

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

Additional copies of this Publication may be obtained from the office of the secretary. The price to members is twenty-five cents per copy and to non-members seventy-five cents per copy.

Vol 9 No. 7

EDITORIAL DEPARTMENT NOTE

The field of specialized accounting is always interesting to the outsider; i.e., the accountant without experience in that particular industry. Any accountant before he can hope to have a truly comprehensive understanding of the application of basic accounting principles must needs have a knowledge of the operation of these principles in several industries. The wider his experience, the more seasoned he is as an accountant, and consequently the greater his value. We are therefore glad to present in this issue two papers dealing with some phases of rail and water transportation.

The first paper, "Some Phases of Railroad Accounting," is by Mr. Lewis A. Bell, Comptroller of the Nickel Plate Road—the New York, Chicago and St. Louis Railroad Company. Mr. Lewis, after a high school education, graduated from Chicago Kent College of Law and entered the railway service October, 1892. Since then he has been consecutively Telegraph Operator, Station Agent, Claim Investigator, Traveling Auditor and Chief Clerk to Auditor. From November, 1908, to June, 1920, he was with the Interstate Commerce Commission (Bureau of Carriers Accounts) as examiner of accounts at Washington, D. C., Examiner in charge of Chicago Office and Assistant Chief Examiner of accounts at Washington. From June, 1920, to date he has been the Chief Accounting Officer of the Nickel Plate Road. He is a member of the Railway Accounting Officers Association, National Geographical Society, The American Academy of Political and Social Science, Ohio Chamber of Commerce, Illinois State Bar Association, and The American Bar Association. His paper was delivered before a meeting of the Cleveland Chapter.

Mr. R. A. Blood is the author of the second paper entitled, Some Phases of Vessel Accounting. This is a subject about which there is very little authoritative literature, due largely to the fact that the phases treated by Mr. Blood are not under the control of the Interstate Commerce Commission and have not therefore been developed along uniform lines. Pickands, Mather & Co., of which Mr. Blood is the chief accountant, are one of the large steamship operators on the Great Lakes. This paper also was delivered before a meeting of the Cleveland Chapter, N. A. C. A.

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SOME PHASES OF RAILROAD ACCOUNTING

By L. A. Bell

IT IS not my purpose to bore you with details of any particular branch of railroad accounting. I will, however, endeavor to give you some general information so that you may be informed in a small measure how it compares with commercial accounting.

As you may know, the accounts of railroads and other common carriers handling interstate traffic are subject to supervision by the Interstate Commerce Commission. The original act to regulate commerce became effective April 5, 1887. Under this act the Interstate Commerce Commission was created. Since then the act has been amended from time to time so that as it stands today its provisions delegate broad powers to that commission. Before dealing with the power to supervise accounts as exercised by the Interstate Commerce Commission under the provisions of the law, it appears appropriate to mention briefly other features of the law with which the railroad accountant is directly concerned. During the period April 5, 1887, to June 29, 1906, not a great deal of statistical information was required of railroads by the commission. While it is true that annual and other reports were rendered to the commission during that period, the information called for was negligible as compared with present-day requirements, which are due principally to the provisions of the amendments to the original act, the first of which was June 29, 1906.

The Interstate Commerce Commission requires several monthly and quarterly reports giving information pertaining to freight service performance, passenger service performance, revenue traffic, fuel for train locomotives, employee service and compensation, and various other matters. It also asks for an annual report, requiring approximately 90 pages to set forth the information called for. This information comprises a brief history of the organization, a list of Directors, Officers, twenty of the largest Stockholders, Comparative General Balance Sheet, Income Profit and Loss, Operating Expenses, Revenues, and many other schedules pertaining to the current year's operations.

In addition to the requirements of the Interstate Commerce Commission of the numerous reports embracing data of a statis-

tical character, railroads are called upon to furnish similar information to the various State regulatory bodies. These require not only the information called for in the annual report to the Interstate Commerce Commission, but in addition statistics pertaining to interstate transactions. These reports are used by the Interstate Commission and the various State commissions for statistical purposes and are compiled from the records and accounts maintained by the railroad.

With the exception of notes maturing not more than two years after the date thereof, the amounts of which are limited under the provisions of Section 20a of the Interstate Commerce Act, the Interstate Commerce Commission is empowered to regulate the issuance of securities by railroads. Periodical reports are required by the Commission covering all securities issued under its authority, as well as any evidence of indebtedness issued for which authority is not required by the commission.

The majority of the public appear to be confused in respect of the requirements of the Interstate Commerce Act, pertaining to the establishment of aggregate rates to yield a fair return on the values of railroad properties held for and used in the service of transportation. It appears to be the general idea that the government guarantees to the railroads a return of 6% on the value of the property devoted to transportation service. In fact, even some members of Congress have been quoted as misstating the facts concerning the provisions of the law. Paragraph 2 of section 15a, which is the paragraph requiring the Interstate Commerce Commission to prescribe just and reasonable rates that will allow a fair return on the property devoted to transportation, reads as follows: "In the exercise of its power to prescribe just and reasonable rates the Commission shall initiate, modify, establish or adjust such rates so that carriers as a whole (or as a whole in each of such rate groups or territories as the Commission may from time to time designate) will, under honest, efficient and economical management and reasonable expenditures for maintenance of way, structure and equipment, earn an aggregate annual net railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation; providing that the Commission shall have reasonable latitude to modify or adjust any

particular rate which it may find to be unjust or unreasonable, and to prescribe different rates for different sections of the country." There is no language in the Interstate Commerce Act under which it can be construed that the government guarantees railroads a specific net return. The act provided that for the two years beginning March 1, 1920, 5½% on the value of the property devoted to transportation service with ½% additional in the discretion of the commission should be deemed a fair return, and the commission has subsequently determined under the requirements of the act that 5¾% of such value represents a fair return. This rate of return applies to railroads as a whole rather than to any single railroad, and at no time have the railroads as a whole earned the fair return.

In the event a railroad receives for any one year a net railway operating income in excess of 6% of the value of the railway property held for and used by it in the service of transportation, the Interstate Commerce Act provides that one-half of such excess shall be paid by the railroad to the Federal Government for the purposes of establishing and maintaining a general railroad contingent fund to be used by the Commission in furtherance of the public interest in railway transportation, either by making loans to carriers to meet expenditures for capital account, or to refund maturing securities originally issued for capital account, or by purchasing transportation equipment and facilities and leasing the same to railroads. The remaining one-half shall be placed in a reserve from which the railroad may draw for the purpose only of paying dividends on its stocks, interest on its bonds or other securities, or rent for leased roads, to the extent only that its net railway operating income for any one year is less than 6% of the value of the railway property held for and used by it in the service of transportation. Such reserve fund need not be accumulated and maintained beyond a sum equal to 5% of the value of the property devoted to transportation, and when such fund is so accumulated and maintained the portion of the excess income which the railroad is permitted to retain may be used for any lawful purpose. Therefore, while a single railroad can retain, if earned, an amount equal to 6% of the value of property devoted to transportation service, plus ½ of any excess thereof, which can be used

only for certain purposes, the railroad is not guaranteed any specific rate of return on such property by the government.

One of the purposes of Section 20 of the Interstate Commerce Act, which is the section under which the Commission functions in respect to accounting matters, is to secure uniformity in accounting. Subsequent to the amendment of June 29, 1906, to the Interstate Commerce Act, the Interstate Commerce Commission promulgated under its orders accounting rules and regulations covering the various classes of receipts and expenditures and other debit and credit items to be accounted for by railroads and other common carriers subject to the act. Those rules and regulations have been revised at different times and some of them are undergoing revision at the present time. The various classifications issued under order of the Interstate Commerce Commission embrace the thought and ideas not only of the Commission's Accounting Representative but also those of the railroad Accountants through members of the Railway Accounting Officers' Association who are assigned for the specific purpose of co-operating with the accounting representatives of the Commission.

Prior to the time the commission under its order issued its rules and regulations governing accounting, a high degree of uniformity in accounting did not exist among the railroads of the country. It is true that the railway accounting officers' ideas were stated through the medium of the Railway Accounting Officers' Association, but as there were no mandatory rules governing accounting, the individual officer would account for further transactions in whatever manner he felt was appropriate to produce the proper showing for the company he represented.

The Interstate Commerce Commission's requirements in respect to uniformity in accounting makes its possible for the public and investors to secure more definite information concerning the results of operation, the financial structure of the railroad, and the changes in its assets and liabilities, so that the results of one railroad may be compared with those of another. As an illustration of the comparisons which may be made, one of the items developed is the ratio of the total operating expense to operating revenues, and since the operating revenue accounts of all carriers are developed uniformly this comparison tends to reflect operating efficiency of the carriers compared. Inasmuch as operating ex-

penses are stated by primary accounts, there being approximately two hundred of such accounts, which are grouped under eight general accounts, it is possible to derive further benefit from such comparison by computing the rate to any particular account desired.

The present classifications issued under orders of the Interstate Commerce Commission cover different branches of accounting and provide the general accounts and the primary accounts which railroad accountants are compelled to follow in making allocations of receipts and expenditures and other debits and credits. These classifications require carriers to keep records in sufficient particularity to show fully the facts pertaining to all entries made in the accounts. Two of the classifications in which it is thought you may be particularly interested are:

1. Classification of Investment in Road and Equipment.
2. Classification of Operating Revenues and Operating Expenses.

The classification of Investment in Road and Equipment deals only with the investment in property devoted to transportation service, while investment in property acquired for future use, such as land acquired for future use or land acquired for possible terminal or track use, or for purposes not directly connected with transportation service, such as coal mines, hotels and restaurants, etc., are classified under a separate account on the general balance sheet, the revenues and expenses applicable thereto being treated in the operating statement as Income and not as items relating to operation. This classification provides for sixty-two primary accounts which are grouped under three general accounts, namely, Road, Equipment, and General Expenditures. The primary accounts grouped under the general account "Road" are for the purpose of showing the cost of land, fixed improvements, and roadway, machines and tools owned by the railroad and devoted to transportation service; and the primary accounts applying to the general account "Equipment" are designed to show the cost of the several classes of equipment owned by the railroad or held by it under equipment agreements for purchase. The primary accounts under the general account "General Expenditures," as stated in effect in the text of that account,

are designed to include expenditures made in connection with the acquisition and construction of original road and equipment, and with extensions, additions, and betterments to road and equipment property, when such expenditures cannot properly be included in any of the accounts under the general accounts Road and Equipment as a part of the cost of any specific work. When assignable, such expenditures shall be included in the cost of the property in connection with which the expenditures occur.

The charges to the Investment in Road and Equipment accounts are based upon the cost of the property acquired, and if the consideration given for the purchase or improvement of property is other than money, the money value of the consideration at the time of the transaction is charged these accounts. The Interstate Commerce Commission's classification provides that costs shall be actual money costs to the carrier. Where a portion of the funds expended by the carrier has been obtained through donation by States, municipalities, individuals, or others, no deductions on account of such donations are to be made in stating the cost. Contributions for joint expenditures are not considered as donations. The carrier's proportion of the cost of joint projects, such as construction of jointly owned tracks and elimination of highway crossings at joint expense are included in these accounts. One of the major items to be included in the accounts for Investment in Equipment is the cost of construction, which includes the cost of labor, material and supplies, work train service, special machine service, transportation, contract work, protection from casualties, injuries and damages, and privileges.

Several items just mentioned are defined by the Interstate Commerce Commission as follows:

"a. Cost of labor includes amount paid for labor expended by the carrier's own employees, including the cost of labor expended for preliminary work, such as sinking test holes or making soundings for tunnels, grading, building, and other structures; and the cost of labor expended in laying and taking up tracks for temporary use in construction, except the cost of labor expended on tracks provided for the protection of traffic during the progress of addition and betterment work. Office expenses and traveling and other personal expenses of employees, when borne by the carrier, shall be considered a part of the cost of the labor, as shall the cost

of fidelity bonds and employers' liability insurance premiums. When officers or employees are specially assigned to construction work their pay and their traveling and incidental expense while thus engaged shall be included in the cost of the work. No charge shall be made against Road and Equipment accounts for the pay of officers who merely render services incidently in connection with extensions, additions, or betterments, although traveling and incidental expenses incurred by such officers solely on account of such work shall be included in the account to which the cost of the work is chargeable.

"b. Cost of materials and supplies includes the purchase price of materials and supplies, including small tools, at the point of free delivery, plus the cost of inspection and loading assumed by the carrier; also a suitable proportion of store expenses. In calculating the cost of materials used, proper allowance shall be made for the value of unused portions and of cuttings, turnings, borings, etc., for the value of the material recovered from temporary tracks, scaffolding, cofferdams, and other temporary structures used in construction; and for the value of small tools recovered and used for other purposes.

"c. Cost of work train service includes amounts paid to others for rent and maintenance of the equipment used: cost of labor of enginemen, trainmen, and engine-house men, including the wages of engine crews and train crews held in readiness for such service; and the cost of fuel and other supplies consumed in connection with the operation of the work trains. It shall also include the cost of maintaining the carrier's own equipment used in construction service and a fair rent for such equipment while so used.

"d. Cost of the special machine service includes the cost of labor expended and of materials and supplies consumed in maintaining and operating steam shovels, scrapers, rail unloaders, ballast unloaders, pile drivers, dredges, ditchers, wood burners, and other labor-saving machines; also rents paid for use of such machines.

"e. Cost of transportation includes the amounts paid to other companies or individuals for the transportation of men, materials, and supplies, special machine outfits, appliances, and tools in connection with construction. Freight charges paid foreign lines for the transportation of construction material to the carrier's line

shall be included, so far as practicable, as a part of the cost of the material, when such charges are borne by the carrier. A fair allowance representing the expense to the carrier of such transportation in transportation service trains over the carrier's own line also shall be included.

"f. Cost of contract work includes amounts paid for work performed under contract by other companies, firms, or individuals, and costs incident to the award of the contract.

"g. Cost of protection from casualties includes expenditures for protection against fire, such as payments for discovery or extinguishment of fires, cost of detecting and prosecuting incendiaries, witness fees in relation thereto, amounts paid to municipal corporations and others for fire protection, and other analogous items of expenditure in connection with construction work.

"h. Cost of injuries and damages includes expenditures on account of injuries to persons or damage to property when incident to construction projects, and shall be included in the cost of the work in connection with which the injury or damage occurs. It also includes that portion of premiums paid for insuring property applicable to the period prior to the completion or coming into service of the property insured.

"i. Cost of privileges includes compensation for temporary privileges, such as the use of public property on streets."

The Interstate Commerce Commission in its endeavor to limit investment charges (and also operating charges) to actual costs does not follow the recognized commercial practice of treating cash discounts as an income item but instead requires that cash discounts be treated as a reduction of costs, and this regardless of the fact that, if advantage is not taken of cash discounts, the full amount paid by the railroad is to be included in investment account, or appropriate operating expense accounts as the case may be.

Of course, as cost accountants, you all know that it is not a difficult task to allocate direct charges, but when it comes to making a distribution of indirect charges such as overhead expense, it becomes more complicated and it is necessary to arrive at a fair basis in prorating such items. To illustrate: The Interstate Commerce Commission requires, as previously stated, that a fair allowance

be made to represent the expense to the railroad for transporting in transportation service trains, material used in the projects the cost of which is chargeable to Investment in Road and Equipment accounts. It is possible to consider certain factors which will produce a certain result in arriving at a fair allowance, but it is a difficult task to determine what part of the wear and tear of the roadbed and tracks is applicable to the cost of the transportation of material used in property, because of the fact that commercial traffic of different classes and varieties, the handling cost of which differs, is transported in the same train, with the same train crew, as well as the fact that the roadbed and track are also used for passenger service. In other words that part of the cost represented by the wear and tear of the roadbed and track cannot with any degree of accuracy be apportioned to cost of commercial service, passenger service, or company service.

The railroad accountant has to deal with many similar problems and although the Interstate Commerce Commission has laid down definite rules to be followed in a great many instances, yet there are quite a few instances where it has not done so, but instead has left it to the railroad to work out such problems on as fair a basis as is possible so to do.

Another item of considerable moment in connection with construction of any large project is that of interest during construction, which includes expense and discount suffered through the issuance of bonds or other evidences of indebtedness. In the event bonds are issued to provide the funds for property investment and are sold at a discount, such discount, as well as the expense suffered, is assignable to the period between the date of actual issuance of the bonds and the time when the property, or the improvement made, becomes available for the service for which it is intended. Hence only that portion applicable to the construction period is includable in investment account. The balance of such discount and expense remaining at the time the property becomes available for use must be amortized over the remaining life of the bond by yearly charges to income or, at the railroad's option, profit and loss account may be charged with all or any portion of expense remaining at any time unextinguished.

Like manufacturers who have articles to sell the railroad also

has something to sell, namely, transportation; and in order to do so successfully, in either case, it is essential that the cost of producing the articles or the transportation—which includes the receipt, conveyance, and delivery of traffic—must be ascertained. In this connection it appears appropriate to mention briefly some of the operating items with which the Classification of Operating Revenues and Operating Expenses deals. The accounts of this classification are designed to show the revenues and expenses—including the maintenance of the facilities used—of the railroad's operations and services incidental to transportation.

The operating revenue accounts consist of four general accounts under each of which appropriate primary accounts are grouped, while operating expense accounts consist of eight general accounts under each of which, like the operating revenue accounts, there is a number of primary accounts. The accounting, insofar as it is practicable, is accomplished on the basis of accruals. When for any cause the amount of any item affecting operating revenues or operating expenses cannot be accurately determined in time for its inclusion in the accounts of the month in which the transaction occurs, an estimate of the amount of the item is included in the account and the necessary adjustment is made later when the item is audited. This applies to all current items except minor ones which do not appreciably affect the operating accounts. These minor items are accounted for at the time they are audited and are treated as current items. The accounting rules require railroads to debit the credit operating accounts with delayed items, i.e., items representing transactions which occurred before the current fiscal year when such items, if current, would be applicable to those accounts. When no provision has been made through entries to the operating accounts for delayed items, they must be included in the operating accounts during the month or the year in which they are audited, depending on the amount involved, i.e., if the amount is relatively so large that its inclusion in the accounts for a single month would seriously distort those accounts it may be distributed in equal monthly charges to the remaining months of the current fiscal year. However, if the amount is relatively so large that its inclusion in the account for a single year would seriously distort those accounts, the amount or any part of it may be charged to

Profit and Loss upon the approval of the Interstate Commerce Commission after the railroad has filed with that Commission the full particulars concerning the amount and the reasons which in its judgment indicate the propriety of such accounting. But unless the amount is unusually large or serious distortion would result because of its inclusion, the Commission would deny the request of the railroad to make the charge to Profit and Loss.

Another provision of the classification of Operating Revenues and Operating Expenses deals with the equalization of expenses. When railroads adopt a budget or estimate of expenditures for maintenance of fixed improvements or equipment for the year, such authorized estimates may be equalized by division into twelve parts, if for a full year, or into a number of equal parts corresponding to the months remaining in the year after the adoption of the maintenance program. Although the use of reserve accounts to accomplish this accounting is permitted throughout the year, these accounts must be cleared at the close of the year so that only the actual expenditures for maintenance is reflected in the accounts. This provision is optional and it is also quite an appropriate one because the great amount of maintainence necessary for the upkeep of the properties must be done during the months in which weather conditions are most favorable. Especially is this true in respect to fixed improvements.

A railroad's existence depends on constant action in all its parts. Hence the question of upkeep becomes an extremely important one. Unless fixed improvements and rolling stock are kept in constant repair the operating efficiency of a railroad becomes greatly limited. The accounts provided for maintenance of fixed improvements such as structures, bridges, buildings, etc., and of equipments, as stated in the classification of operating Revenues and Operating Expenses are designed to show the cost of repairs and also the loss through depreciation of the property used in operations, including all such expenses resulting from ordinary wear and tear of service, the exposure to the elements, inadequacy, obsolescence, or other depreciation, or from accident, fire, flood, or other casualty. It will thus be observed that, as in the case of investment charges, operating charges are based on cost. If repairs in kind are made to rails, ties, or other parts of the road, the cost

of the material used in such repair work, plus incidental costs analogous to those which I enumerated when discussing costs under investment accounts, is charged to operating expenses, credit being allowed for the salvage recovered from the parts removed. In the application of better or heavier rails for those released, only the cost of the heavier or improved quality or type applied, in excess of the cost at current prices of rails of the weight, type and quality released, is charged to investment account. This same general principle is true in the case of ties and other materials. Therefore, no part of costs of labor for unloading, distributing and putting rails, ties, etc., in the tracks, or cost of work, train service and other expense, is includable in investment account. Thus, while the classification dealing with operations is predicated on costs, there are certain elements of costs included in operating expenditures which could be appropriately included in investment, but to do so would no doubt entail meticulous differentiations.

Although the Interstate Commerce Commission is empowered under the Interstate Commerce Act to prescribe the classes of property for which depreciation charges may properly be included under operating expenses, and the percentages of depreciation which should be charged with respect to each of such classes of property, it has not as yet issued formal orders in this respect. However, hearings bearing upon this subject have been held by the commission and it is understood that final determination of the subject has not as yet been accomplished. The Classification of Operating Revenues and Operating Expenses provides, however, for optional accounting for depreciation in respect to fixed improvements, while in the case of equipment, it is mandatory that operating expenses shall be charged with amounts representing depreciation, leaving it to the railroads to determine equitable rates based on experience and their best sources of information.

Although I have presented but a very few of the salient points in respect to the accounting required of railroads, I am afraid that I have already over-taxed your patience. However, in concluding it may be of interest to you to know how the gross revenues of railroads are distributed. The committee on public relations of the eastern railroads published a chart, or what it termed a "Railroad Calendar," based on data for the year of 1924—supplied by the

Bureau of Railway Economics, a bureau in Washington, D. C., which deals with railroad statistics—showing that out of the gross revenues of an entire year it took the receipts of:

157 days for wages
27 days for locomotive fuel
70 days for material and supplies
24 days for all other operating expenses
21 days for taxes
41 days for interest and rents
19 days for dividends

This leaves only six days' receipts for improvements out of earnings or to make up losses of former years or to help create reserves against bad years in the future.

SOME PHASES OF VESSEL ACCOUNTING

By R. A. Blood

FREIGHT transported on the Great Lakes is grouped into three divisions, namely, bulk freight, package freight, and passenger. Bulk freighters do not come under the jurisdiction of Interstate Commerce Commission. Practically all of the package freighters and passenger steamers do come under their supervision.

My talk will deal with the bulk freighters. These transport coal up the lakes, which traffic is referred to as "West bound," and ore, grain and limestone down the lakes, which is termed "East bound."

The unit of cost is determined by the nature of the ship's business. If the vessel is operated in conjunction with the production of some commodity such as steel, the unit of cost per ton is used; if the vessel is used as a transportation facility, only, it is obvious that this unit of cost would not be applied.

There is one company's fleet on the lakes which carries freight for their own use only, and it freights ore "East bound," with a few cargoes of coal shipped up bound, to be used in the operation of its mines. The unit of cost in this case is based on the ore tonnage only. They reduce the cost of moving the ore by vessel, by any other revenue the vessel may earn. That is, after determining the cost of operating the vessel, if it is found that this vessel has earned freight in carrying a cargo of coal up the lakes, this coal freight income is deducted from the total cost of operating the vessel rather than being shown as revenue. Some of the transportation companies use other methods of determining costs; some figure on the basis of miles traveled; others on the 1,000 ton mile basis; and a few, I believe, still use the antiquated cost per trip.

Up to 1900 vessel costs were generally figured on the basis of a round trip, and most of the accounting was done aboard the vessel by the Master, because in the early days the Master was practically the fiscal agent for the owner. He contracted most of the bills, collected his freight earnings and paid the operating expenses. At the end of each trip he sent to the owner a trip sheet

showing his income and the vessel's expenses. If there was any profit a draft to cover it was enclosed with the trip sheet.

When the steel ship came into use, it was built to carry considerably more tonnage than the old style wooden vessel. Improvements were made at the loading docks as well as at the discharge docks. As fast as the larger ships were developed, the dock facilities were also improved in like proportion; and oftentimes the dock facilities improved more rapidly than did the carrying capacity of the ships.

In referring back to the time of the small wooden vessel which carried from 1,500 to 2,000 tons, we find that the vessels were in port a great deal longer than they were on the lakes sailing, as it took from 3 to 5 days to load and as long as 6 to 7 days to unload. The fastest record that has been made for handling a cargo in and out of one of the modern ships occurred in September, 1921. A steamer of 12,000 tons capacity loaded a cargo of 12,508 tons of ore in 16½ minutes. The cargo was unloaded at Ashtabula 4 days later in 3 hours and 5 minutes. This gives an idea of the general improvements and developments in the Great Lakes transportation system. This record, of course, is not maintained. However, the loading time on cargoes very seldom requires over 12 hours, and the unloading is equally proficient.

It is readily understood that the Master of the ship has been relieved as fiscal agent long since. All the purchases of supplies required for the vessel during the operating season are made by the Master and Chief Engineer of the ship, through the stores at the port in which the boat calls, by means of written requisitions. These orders are made in triplicate; the original copy going to the vendor, the second copy is sent to the home office after the materials are delivered aboard the ship; and the third copy remains aboard the vessel for reference. The vendor is requested to send his invoice to the home office. This places in the accountant's hands all the information in connection with purchases for the vessel, market prices being available for all lake ports, and a copy of the requisition coming to the office certifies that the goods have been received, and justifies the passing of the invoice for payment, all of which relates to the cost of operating the ship regardless of the unit of cost used.

After experimenting with the different methods stated above in figuring costs, it was found that none of them was satisfactory. However, from 1900 to 1914 our office was using the cost per ton, but at the same time this method was not giving satisfaction. In the first place, every cargo loaded is different in the matter of tonnage. A 10,000 ton vessel may load but 9,800 tons, and the very next trip will load up to 10,000 tons, and sometimes to 10,100 tons. Therefore, the cost per ton on the latter cargo would be less than on the former cargo, providing that the actual operating cost of the ship had not increased. We felt that, due to this condition, we were not finding the true cost of operating the vessel.

After many conferences between the Operating and Accounting Departments, it was decided that the Accounting Department should make a study of costs that would apply to transportation. The past experience that the Accounting Department had had, convinced them that the cost per day of operation was the answer to the problem, and they forthwith worked out a full year on that basis. And in comparison with this cost per day an exhibit of the cost per ton was shown.

This statement has solved the problem and the Operating Department agrees that the cost per day gives the required information. It was surprising to them to note the straight line of the graph of these costs from month to month, while the cost per ton was a wavering line. The cost per day has been the basic unit in our office ever since.

At the end of the year we figure a commodity cost. The object of this is to observe what the ratio of costs per ton is to freight craned, but to get at this problem we must first know the cost per day. We do not figure this cost on individual vessels, but rather group the vessels by their carrying capacity. This cost is figured between ports; that is to say, we find the cost per ton of moving a commodity from the head of the lakes to Buffalo, Erie, Ashtabula, Cleveland and Toledo. The commodity cost is used to cover all the principal ports. This, of course, is not a cost of operating ships, but is used primarily for determining freight rates. We will have more to say on this subject a little later.

Our vessel cost sheets exhibit costs of the following items:

Supplies	Extra Cargo Expense
Repairs	Towing
Labor	Fuel
Insurance	General Expense and Taxes
Fitout and Winter Expense	Depreciation and Obsolescence

Once a year, we make an analysis of the Supply and Repair accounts of which there are 30 Supply accounts and 53 Repair accounts.

It may be of interest to you to hear how we dispose of overhead items, and how deferred charges accumulate, for the reason that the navigation season is but 229 days out of a year. You have all heard of the opening and closing of navigation on the lakes. This period is between midnight April 15th and midnight November 30th, and amounts to 229 days. This is the period that the vessels are covered by insurance. The season, however, can be cut short at either end of the season—at the beginning, due to the ice condition, and at the end due to poor business conditions as well as ice.

For the purpose of disposing of overhead and fixed charges, we end the season theoretically on October 30th. Therefore, if the vessel is able to sail at midnight the 15th of April, she will be operated theoretically 199 days, and all deferred items and fixed charges are charged to operations on the basis of 1/199 a day.

The deferred charges consist of wages paid all employees during the winter months. Winter expense consists of shipkeepers' wages and dock rentals for winter moorings, and the general expense and taxes which occur in the in-operative period. This naturally burdens the cost heavily during the operating period, but due to the fact that it is very seldom that the vessels are laid up earlier than the 15th of November, we find that the November cost sheet will bring the season's cost to the expected level. These costs are figured monthly, but are not in step with a calendar month. The vessel's month is brought to a close on her arrival at an unloading port with the last load of east bound freight taken aboard in the month. This keeps the cost in step with the revenue. There have been times that the vessel would have as many as 42 days in the month's operation; and on the other hand there are times when the boat is in operation fewer days than the days of the calendar month.

I mentioned that I would tell you more about commodity costs. These are figured out on a theoretical basis. In the first place, the vessels are built to carry ore. Handling other commodities is incidental to ore freighting. However, the transportation of coal "West bound," and grain and limestone "East bound" have come in for a large share of the credit for the increased traffic on the Great Lakes. Prevailing freight rates on "East bound" cargoes have always been higher than those on "West bound," and the lower rates in the "West bound" freight are due to ships having to return to upper lake ports for ore, grain, and limestone cargoes. Due to the "East bound" freight rate being higher, it is natural that such freight should stand the burden of operating the ship, and we necessarily have to divide the time consumed by charging the larger portion to the "East bound" freight. This is done in the following manner. The time consumed sailing "West bound," whether under cargo of coal or light is charged to the ore time. In case the vessel is burdened with coal, we charge against the coal, only the time it takes to load at the lower lake port and unload at the upper lake port. The balance of the time, including the loading of the ore cargo and the run down the lakes, is charged to the ore cargo. In case, however, any "West bound" freight is carried the entire run up bound is charged to the ore cargo. If, however, the coal cargo takes the vessel off of the regular ore course, then the time she is off the ore course until she returns to the ore course, is charged against the coal cargo. This theory has been discussed pro and con many times, and always brings up very interesting discussions.

This year, we are trying out an experiment in the way of charging off repairs both ordinary and extraordinary.

Last winter, we made an exhaustive study and analysis of the repairs on each vessel, covering a period of 13 years, and we found that about every third year there were some extraordinary repairs required on each vessel. It had been our ultra conservative custom in past years to charge up to operation all the repairs in the year in which they were made, regardless of the extent or amount involved. All such repairs that were made during the in-operative period, or winter months, are first charged into deferred account and charged off to operation on a per diem basis during the operating season. I know that some of you men would say that these

large repairs should be charged off over a period of years; and I think we all agree that that is the generally accepted procedure. We have reversed this latter method, and now are accruing our repairs through our costs and setting up on our books a "Repair Reserve Fund."

In making a final synopsis of the above mentioned study, we grouped the vessels according to their carrying capacity, and figured the average cost of repairs for a year, and we now accrue this average annual repair cost, thus keeping the repair charges in our cost account uniform or constant. Heretofore, this has been one of the items in our cost that showed the greatest fluctuation. We have been watching the progress of this account very closely, and thus far it has worked out beyond our expectation. This seems to be an entirely new idea in vessel accounting practice. We believe that the practice is safe and sound, as it provides the funds for meeting large repair costs before the repairs are made. The final analysis of this repair account will be made at the end of the year, which will show how much each boat contributed to the fund, and how much each one cost the fund. No capital account items will be paid from this fund as it is only intended to cover repairs which affect the operating costs.

The Cost of Cost Accounting

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

In a period of depression when profits are in the red, or in one of keen competition when the profit margin becomes narrower and narrower, the operating structure of a business from cellar to garret is scrutinized under the magnifying glass in an endeavor to uncover all possible points at which economies of operation can be made. At such a time it not infrequently happens that all so-called superfluities, especially of a non-productive or at least of an indirect income producing character, are cast into the discard. Because of an inability to determine the relative values of such departments, too often this is done without necessary discretion and valuable activities are cut off indiscriminately without a hearing. And the cost department is often included with the others.

The current publication is, therefor, very much to the point, and and its author, E. F. Papworth, speaks with authority. He was born in Syracuse, N. Y., in 1891, educated at the Public Schools of his home town and was graduated from Syracuse University, with the degree of M.E. in the year 1913. Since that time he has held the following business positions: Remington Typewriter Works, Syracuse, N. Y., Time Study; Yawman & Erbe, Rochester, N. Y., Time Study, Planning Dept., Foreman; Gould Storage Battery Co., Depew, N. Y., Industrial Engineer, Research Engineer, Asst. Superintendent, Chief Inspector; Fox Typewriter Co., Grand Rapids, Michigan, Superintendent; C. E. Knoeppel, Inc., New York City, Staff Industrial Engineer; and Brown-Lipe Chapin Division of General Motors Corporation, Syracuse, N. Y., as Industrial Engineer, Asst. Secretary-Treasurer and Comptroller with which company he is at the present time employed.

Mr. Papworth is a member of our Syracuse Chapter, N. A. C. A. and is the Secretary-Treasurer of the Central New York Section of the Taylor Society. This paper was presented at the N. A. C. A. Regional Conference held under the auspices of the Rochester Chapter, October 30, 1926

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THE COST OF COST ACCOUNTING

FOR the past fifteen or twenty years there has been an increasingly insistent demand on the part of general managers, financial officers, and industrial engineers for more accurate and up-to-the-minute cost statistics. The fact that we are discussing the cost of cost accounting here this morning, I think you will agree, is an indication that there is a slight reaction setting in after all of this somewhat feverish quest for the truth about our businesses. We still want to know enough of fundamental truths to enable us to conduct our businesses successfully, but we are gradually getting beyond the position where we are willing to pay for the accumulation of filing case after filing case of data, in neat and orderly form, which is seldom, if ever, used. In other words, we are beginning to scrutinize the costs of compiling our records and to weigh carefully their value. Like anything else, to be in a healthy stable position, our cost departments must be worth a little more than they cost to stay in business.

My thought along this line was given considerable stimulus about a year ago by the receipt of a letter from the newly appointed works manager of a successful western automobile company. This man is an engineer and, prior to this position, I believe had been engaged in construction work on factory buildings, etc., for a well known firm of construction engineers. As he is naturally a fast and energetic worker and was very desirous of improving the profit showing of his company, he no sooner got his feet on the ground than he began operating on their overhead.

So far as factory indirect labor, expense material, spoilage, etc., were concerned, I gathered from the tone of his communication that he had been quite successful, but in spite of his best efforts he was surprised at the very large number of purely clerical workers who seemed to be necessary from some angle or other, to the conduct of the business. He could not bring himself to the point of seeing how a bunch of people sitting around at desks and making marks on expensive printed and ruled forms and dashing hither and yon with a business-like air, with a sheaf of papers in either hand, could possibly be of any material assistance to him in building a better car for less money. Maybe he has altered his viewpoint by now, I do not know, but his original attitude was cer-

tainly interesting and stimulating to me. To see how his overhead in this respect compared with others, he gave me some figures which appear in column "A" of the following table. Columns "B" and "C" are figures on as nearly a comparable basis as possible from an eastern automotive parts factory and a household necessity manufacturer, respectively.

Cost of Payroll and Cost Accounting for One Month

	A	*B*	*C*
Shop Clerks	$1,125.00	$2,640.00	$2,610.00
Payroll Department	660.00	918.00	1,700.00
Costs	2,790.00	1,414.00	457.00
Tabulator	.....	.....	528.00
	$4,575.00	$4,972.00	$5,295.00
Direct Labor same period	80,500.00	92,400.00	95,500.00
% Payroll & Cost Accounting Expense to Direct Labor	5.7%	5.4%	5.5%

You will notice that, so far as productive labor dollars measure size, the three plants are about of a size. The job confronting the payroll and cost departments of the three organizations must be very different, however. Take the matter of wage payment plans alone, "A" was largely group bonus, "B" was 90% individual piece work, and "C" had several different plans, including a rather complicated profit-sharing plan based on length of service, etc. The astonishing thing is that with all of these many variables the ratio of payroll and cost accounting expense to productive labor is so nearly alike in the three cases. Mind you, I am not saying that this coincidence justifies the expenditure of something over a nickel per productive labor dollar in any one of these cases, but I do say that it is 5.5% overhead in which it behooves this group of men and women to be vitally interested.

If we do not concern ourselves with these things, some new general manager, works manager, comptroller, efficiency expert or what not, with prying eye and judicial mind may come along and

make a fine showing for himself by swinging a *mean* axe in our departments. I am here today to suggest that we beat him to it, make our own analysis of our own situations, and get such changes made as our analysis proves to be desirable so that when any of the here-in-before mentioned gentlemen shows up he will have nothing but commendation for our performance. Probably many of us are not heads of departments of any kind but merely hold down an accounting desk of some sort. At least you can analyze your own jobs with a cold judicial eye and attempt to arrive at a better appreciation of the relation of your particular function to the business as a whole. If, after thorough and painstaking consideration, you decide that certain portions of your work are not worth while or that they could be simplified and improved, talk it over with your boss at the proper time. At least, this will show that you are thinking about your work, as well as the baseball score, tonight's date, etc. Of course, if you approach him in the wrong way at the wrong time, he may fire you on the spot; but, who can tell, maybe that would be the best thing that could happen to you if you are not engaged in useful and interesting work which taxes your present capacity to somewhere near the limit.

What can be done to reduce the cost of cost accounting? For convenience, let us subdivide our analysis under these main classifications:

1. The Job
2. The Equipment
3. The Personnel

These items will be considered in turn.

The Job

Knowing well that I am treading on dangerous ground even to mention this phase, may I venture to suggest that some of our cost systems are top heavy with too much detailed information. Thousands of direct labor tickets per week and thousands of indirect labor tickets! You know what I mean, the quantity of pieces of paper to be priced, extended and tabulated is enormous. Some times in your experience, as well as my own, a single operator may change his card from 12 to 20 times a day. This means work for factory clerks, for the payroll department, and for the cost department. It is dangerous to generalize on these things but it cer-

tainly seems to me that when it becomes necessary under a certain system for a man to walk to a clock and change his card any oftener than once per hour, something is wrong with the system. If any of you have tried to operate a blue print and operation cost scheme in a plating or japanning department, where perhaps three or four people handle a hundred or more different parts per day through five or six operations, you know what I am talking about. Perhaps the blue print and operation cost scheme is ideal for these same parts through the foundry, punch press or other machining operations, but when we come to such operations as dipping, spraying, plating, tumbling, wiring up and unwiring, something else should be done. The obvious solution is to use the blue print and operation or special order system on the operations where they fit, and to have general operation, or standing operation numbers for those operations which are common and practically identical for a large number of blue print or order numbers, perhaps sub-dividing your product into three or four classes on each operation.

This will materially cut down the number of time cards and will generally produce more satisfactory costs both from the standpoint of computation and application to cost of sales.

Perhaps some one here who is better versed than I am on standard costs will tell us the effect of such a system on clerical costs. I should certainly think that it would be much more economical than some of the other systems. As I understand it, a standard cost system works on the "exception" principle. That is, the 90% of your detailed data representing material at standard cost, is shoved aside at one fell swoop and labeled "standard," while the remaining 10%, or the "non-standard" portion, is gone over with a fine tooth comb, analyzed by causes and referred to some executive in condensed and intelligent form for his information and action. If I am wrong in this brief description, I trust that some of our standard cost friends will publicly set me right before the close of this meeting. At any rate, the thought of handing cost information to operating executives in simple and condensed form so it will be understood and used, I think we all agree, is a good one. There is no joy to the average general manager, works manager, superintendent or foreman, in voluminous reports containing page after page of neatly tabulated figures. They may say out of sheer awe, "This is a fine piece of work" but ten chances to one they

will throw it down unread and even if read, not understood. What these men want are a few ratios and figures which will express to them in simple terms the efficiency of the various departments of their business.

I came across a shining example of this sort of thing in the way of a spoilage report to superintendent and foremen. The cost department consolidated and listed all of a department's spoilage by part number and operation number, showing total cost, including material, labor and overhead for each item. In some departments the result was a sheaf of single-spaced typewritten sheets about the thickness of the American Magazine. Everyone was "flabbergasted" at the enormity of their sins but no improvement resulted. These same data condensed to a single table which would conveniently fit on one-half of a letter size sheet, showing quantity of pieces spoiled in each of six or seven major classes of parts, average cost each, total cost, % spoiled of O.K. produced, against an objective % spoiled (representing very good practice) and given the right kind of publicity throughout the organization, has resulted in various steps being taken to reduce the spoilage loss nearly 50%. Let us not try to impress our colleagues and superiors with the profundity and complexity of our knowledge and jobs, but rather let us reduce our reports to lowest terms so that they will be read, understood and acted upon.

Speaking of vast volume of time cards, there is one type of wage payment plan which, while providing ample incentive for individual productive effort, keeps the volume of clerical and accounting work down to a minimum. This is group bonus.

Originally, having received my early training under Gantt, Emerson, and Knoeppel, I was a "dyed in the wool" individual incentive exponent and it was my firm conviction that each man's product should be counted separately and that his pay should be based on this count. In processing departments like plating rooms and heat-treating departments, however, I was forced to admit that individual piece work, or other individual incentives fell down, through sheer difficulty of application.

To make a long story short, we tried the standard form of General Motors group bonus in our heat-treating and shipping departments, because it was the only thing we knew of which could be worked under the conditions existing in these departments. It

worked so well in these places that we are gradually substituting the group plan for individual piece work throughout the shop, even on operations where individual counts can easily be obtained.

As some of you may not be familiar with this plan of payment, I will briefly outline its operation.

1. A department or shop is divided into natural groups from 6 to 40 men or operations. A group should consist of operations which are more or less alike or inter-dependent for production showing.

2. A careful time study is made for each operation to be performed within the group and an accurate standard set.

3. The group is charged with the number of man hours actually put in during a payroll period.

4. The group is credited with the standard hours of work finished during the period.

5. Group efficiency equals credits divided by debits or output divided by input and is expressed as a percentage.

6. Percent bonus is based on % efficiency using a bonus curve of the Emerson or Knoeppel type.

7. Each man in the group receives the same % bonus for the time put in but base rates are varied on account of length of service, skill, behavior, etc., the same as any other day rate scheme resulting in varying bonus and total earnings.

For each group then, there is a daily debit or time sheet and a credit slip for each class of product produced. A man goes from one operation to another within the group without changing cards and it is unnecessary to count the product until it leaves the group. There are several advantages to this plan of wage payment, which we have not time to discuss here, but there is one which concerns us vitally and that is the elimination of a considerable amount of clerical work in the factory, payroll department and cost department, through the elimination of individual counts of production and individual time cards. If there are any questions in this connection, I shall be glad to answer them when we come to the discussion.

Sometimes general managers or company officers make unusual demands upon accounting and cost departments for data not readily available, which requires some digging to get out. The tendency usually is for the accounting department to prepare working

papers, sometimes at the expense of considerable effort and time, to enable them to give these data up-to-the-minute in good "snappy" fashion the next time it is asked for, or perhaps it will be automatically prepared and submitted to the "big boss" regularly after the first inquiry, whereas he only needed or wanted it under one particular set of circumstances. The chances are that he will never think of the cost of compiling the report and will not ask for its discontinuance unless the matter is brought to his attention.

It pays periodically to inventory the reports emanating from our departments and check them against their actual usefulness to the people to whom we are furnishing them. If they are not much used, ask for permission to cut them out, or cut them out without saying anything and watch what happens.

Along this same line too many reports are being typed or copied long-hand where the original working papers in pencil, if neatly done, would serve just as well. I have seen several nice little stenographic copying jobs discontinued after a careful study of the real utility of their product. Another advantage of using the original papers is that the time of copying is saved and the data reach the place where they can do some good just so much quicker.

If we are to be held responsible by management for the cost of operating our departments—and we shall be sooner or later—let us show management what some of the practically useless things we are expected to do actually cost. I have seen managers ask for cost on a complicated assembled product "right off the griddle," reflecting last week's labor figures and today's material costs. The cost department would work feverishly, burning "mid-night oil" in some cases and the result would be a plus or a minus of two or three cents on a product costing around $20.00 as compared with the cost used in last month's cost of sales.

In passing, I cannot refrain from mentioning what mathematicians call "order of accuracy." Before we carry all of our average unit costs of labor, material, etc., out four or five places to the right of the decimal point, let us make a few tests to determine what the effect would be if we should drop off the last digit or two, rounding the number up or down as the case may be. You will be surprised to observe how impotent those digits to the extreme right are in their effect on the final result, and if you use calcu-

lating machines of the comptometer type, by dropping a few unimportant digits here and there your number of calculations per operator per day will be increased and the cost reduced.

Of course, it is trite to say that good management and planning are as essential to successful cost work as to any other branch of business. Let us watch out for peaks and do everything possible to avoid them, for when we have radical peaks and valleys of effort, there is a decided tendency to be over-manned part of the time at least. It costs extra to rush work through and does not help its accuracy, so let us avoid rush jobs, wherever possible. We must give prompt and efficient service if our reports are to be of utmost value, but let this promptness and efficiency be a matter of routine rather than emergency.

Do not be afraid to talk your internal problems over with other department heads and your superiors. In many instances, frank discussion of these things will result in a readjustment of the things they require of you and your department which will lead to more being accomplished by your department and at a lower cost.

Equipment

So far as concerns the equipment we already have in our offices, I think all of our mistakes may be summed up for practical purposes by the statement that "too much office equipment is 'sold' and not enough 'bought.'" Next to the insurance salesman, I think there is none of the high pressure type more than the office equipment salesman.

Is there any reason why the same brand of scientific analysis and thought should not be used in the selection of office machines as we find commonly in use in the selection of machine tools for the average factory? The various cost factors as depreciation, upkeep, and labor cost of one method should be balanced against those incidental to the present method, or other proposed methods, and no new investment, outside of replacements or expansions, should be made which will not pay for itself within two or three years in *actual* savings.

Ordinarily, machine posted records are nice things to have from the standpoint of appearance, but I dare say there are places where hand posting is more economical and just as good from a practical viewpoint.

Visible Index, Vertical Cards, and Loose Leaf Ledgers, all have certain points of advantage for certain installations and yet the salesman of any one of these types of equipment will glibly tell you, in many cases, that his particular style of record is the best, without any far reaching investigation. Do not depend too much on what somebody else says. Make your own investigation and analysis and arrive at your own conclusions. What fits in some other payroll or cost department may not fit your case at all. In the choice of equipment, do not let anyone hurry you. You are probably "getting by" all right now, and as your new equipment will have a useful life of at least five years, you can afford to be somewhat careful in its selection.

In connection with the purchase of equipment, have you ever noticed that it is easier to secure permission from some managements to put another name on the payroll at $1,000 a year than it is to secure consent to avoid the addition to the payroll through the purchase of a $500 machine? Sometimes it seems as if we use a different pair of glasses for "Payroll dollars" than we do for "Invoice dollars." We seem to regard the former as unavoidable and the latter as something to be avoided even in the face of our better judgment. Where this condition exists, let us try to encourage a more rational point of view by sound arguments of all kinds.

Before leaving this material side of our job, we should at least mention printed forms. Many of us have too many forms and these of non-standard sizes and extravagantly designed and printed. There is no better way to familiarize yourself with the clerical and paper work of the concern than to study its printed forms and the uses to which they are put. I have personally O.K'd. every purchase requisition for printed forms originated by my firm for the past four years. During this time a saving of at least 50% has been made in the printing bill or an amount equal to the salary of the purchasing agent. These matters are too often delegated to the office boy to handle. This saving was made in the following different ways:

1. Standardizing sizes to cut economically.
2. Increasing quantities to economical quantities to order thereby reducing composition and press work cost per 1,000.
3. Substitution of cheaper stock which serves just as well.

4. Reduction of size of forms through more efficient use of space.

5. Buying from the source which is equipped to produce at minimum cost—i.e., buying tags from the tag companies; correspondence pads from sales book companies; time cards from time card companies; etc. In short, we employ specialists when there is any economy in so doing.

6. Eliminating forms which investigation shows to be of little or no real value to the business as a whole. In this connection we should remember that when we cut out a form which is used only indifferently, we not only save the cost of printing the form, but we also save the time of the person who has to write upon it. In many cases the latter saving far out-weighs the former.

Of course, to do these things, one must know something about print shops costs, how they are affected by quantities; pen rule versus print rule, sulphite bond versus rag ledger stock, manilla versus high-grade index Bristol, etc., but these are things which can readily be picked up from your job printer if you go to him with your jobs and ask him how they can be done more economically.

In a city like Rochester or Buffalo there is little or no economy in operating one's own print shop for factory forms. It used to be almost an axiom that if enough quotations were secured on a certain printing job, some one or more of them would be at or below cost. This situation has improved of late years, however, and the job printer knows something about cost accounting, thanks to his trade associations.

If you have not already done so, look into your total printing bill not only for accounting forms but all sorts of forms; its size will surprise you.

Personnel

This is a delicate subject to discuss as we have quite a few of the personnel right here and they are better equipped for self defense than printed forms and the other things so far discussed. I do not know what your experience has been, but I am astonished at the number of men who are around applying for office positions and, furthermore, many of them appear to be quite competent. The indications are that quite a proportion of these men will have to

seek jobs in some other lines such as production or sales, if they are to keep profitably employed. In our territory (Central New York) I account for this situation in the following three ways:

1. The increasing use of women in clerical and accounting work.

2. The simplification and standardization of accounting procedure and the increasing use of machines.

3. Consolidations of business into larger units, with the result, in some cases, that one office does the work formerly done by two or more. You will agree, I think, that all of these factors are at work, whether we like it or not, and we might as well face facts.

Of course, there is the old argument that you no sooner get a girl broken in on a job than she gets married and you have to start all over again. This is still true to some extent, but with us there is quite a tendency for women to stay in our employ after marriage. Our ratio of women to men in payroll and cost departments is approximately 5 to 1, which is higher than ever before but may go still higher in the future. Our heads of departments and possibly their first assistants are men but women do the bulk of the work, and why not? Certainly I know of no work which is better suited to women than routine clerical work. For the most part they are more alive mentally, quicker, more accurate and better contented with the wages they receive than men working at similar jobs. Mind you, I said routine work. When it comes to contact with shop people, the public and officers of the company, I do not know of many women who would qualify. There is no doubt, however, that there will be an increasing number of women in these positions in the next fifty years. They have the brains, and some of them have a great willingness to learn and apply themselves to their jobs. Under proper supervision and instruction it is wonderful what quantity and quality of work they will turn out.

A moment ago I mentioned that our ratio of women to men has lately increased considerably. This was not done by laying off perfectly good men and replacing them with women. In fact, I think it is safe to say that our men remaining are hardly aware that any change has taken place. As men have quit or were transferred to other work, we have selected a bright girl clerk, stenographer, or calculating machine operator who looked like a fit candidate for the job and put her on it. To our surprise, in several

instances she has walked away with the load in better shape than the man who preceded her.

If you have men posting, calculating, typing, distributing labor or material, or any of these routine jobs, for which standard practice instructions may be developed, you have an opportunity to make a saving through gradual substitution of women.

Morale in an office, as in any group of people, is an important factor in performance. There is nothing more destructive to morale and loyalty than treating clerical workers as if they were a commodity. They are individuals and deserve treatment as such. Of course, one must have certain hiring rates and certain maximum rates beyond which it is not customary to go. However, when an outstanding worker comes along, one for example who is about twice as good as the average we are willing to tolerate, let us recognize this extra ability or capacity by a wage somewhat beyond the maximum ordinarily paid for the class of work involved. Where they are really deserved, one or two rates of this sort in a department will have a very stimulating effect on the whole personnel. There will be a tendency for them all to strive for this same recognition, whereas, if an understanding gets abroad that $25 per week is top money for a certain job, there is a decided tendency for the $25 people to lose heart and to deliver just about $25 worth of work.

I do not believe this applies to every one in this group but once in a while we used to run across an office executive who judged his own importance and value and felt that others were doing likewise, by the number of people working under his jurisdiction or in his department. This is the same fellow who has a lot of push buttons where he can reach them at convenient intervals, particularly when there are callers present. He is also likely to be addicted to the "in conference" habit. Let us "be ourselves" and not try to "kid" any one as to our real importance in this world. When we die, things will go along just as well, or perhaps better.

We only need enough people in a department to handle the work after it has been simmered down to lowest terms. By not having any unused capacity, we keep everybody busy and out of mischief and more contented than when they have to bluff at being busy. Let us make a few informal time studies of our various operations and make out work schedules for our people based on liberal time

standards for the actual amount of work on hand to be done. If you have not done this you will be surprised at the results. The efficiency of use of time in our offices is far below that in the average well conducted factory. This need not be true and you are the fellows who can best remedy this condition so far as your own offices are concerned. The atmosphere in our offices should be one of industry and not that of an afternoon tea. If you have difficulty in maintaining discipline, you will probably find one or two disturbers at the bottom of your difficulty. If they will not line up with your policy after a sufficient opportunity, there is but one course open to you and that is to dismiss them.

You may well ask what all this has to do with the cost of cost accounting. I think it has a lot to do with it, for after the task has been set, either by us or for us, it is our job to see that it is sufficiently and economically accomplished.

After about a year of application of the policies and ideas outlined here this morning, under the headings of The Job, The Equipment, and The Personnel, I was interested to see some new figures for Company B, which you will remember is an Eastern automotive parts plant. These are given below:

Cost of Cost Accounting—Plant B

	One Year Ago	*Now*
Shop Clerks	$2,640.00	$2,340.00
Payroll Department	918.00	800.00
Cost Department	1,414.00	1,279.00
Total	$4,972.00	$4,419.00
Direct Labor same period	$92,400.00	$102,285.00
% Payroll & Cost Accounting Expense to Direct Labor	5.4%	4.3%

You will observe that in spite of an increase in volume of approximately 10%, the dollar labor cost of operating these departments has decreased over $500 and the percentage of cost accounting expense to productive labor has decreased 20%. This is

progress in the right direction, but the man in charge of the work in this institution tells me there is still room for improvement.

This whole matter is not so much one of what our present costs of cost accounting are, but rather what is their tendency—upward or downward? What we need all the time is more effective results for less money and I know you people can do the job smoothly and efficiently if you will go about it in the right way.

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Inventory Control

By
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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

Inventory time is oftentimes a period of sorrow and regret. As the most important single item in the profit and loss story of the fiscal period, it is often the most neglected during the period. There are at times conditions in every business when unfavorable operating results accrue even when all items involved therein are kept under close scrutiny. When results in the red are faced, however, there is less cause for regret if the most important items have been handled with intelligent foresight. Only by means of planned inventory control can any inventory be kept properly balanced both within itself and in relation to the other investments of capital.

At the beginning of the new year is a propitious time for seriously considering this subject. Mr. Frederic W. Kilduff, the author of this paper, is a graduate of New York University and also did special work at Columbia University and at the University of California. His business career has been varied, he having been connected with the American Brass Co.; Blaisdell Canady Co., Engineers; Randolph Clowes Co.; General Electric Co.; Arthur Young & Co., C.P.A's.; J. Lee Nicholson Co., C.P.A's.; and the Holt Manufacturing Co. He is a certified public accountant of Indiana and California. He is at present the Chief Accounting Engineer of the Powers Accounting Machine Corporation. He is also the author of the following books: "Standard Inventory Manual," "Auditing and Accounting Hand Book," "Inventory Practice and Material Control." He is a member of the National Association of Cost Accountants; an Associate of the American Institute of Accountants; and an Associate of the American Society of Mechanical Engineers.

This paper was presented before the New York Chapter, N. A. C. A.

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JANUARY 1, 1928

INVENTORY CONTROL

In discussing the subject of inventories this evening, the following sections will be taken up in their respective order:—

1. Factors which have effected noticeable changes in the inventory situation since 1920.
2. Material control.

1920 holds the unique position of being that year in which greater inventory losses were suffered than any other similar period of time in the business history of this country. That year is not so long ago that we cannot bring to mind a fairly accurate flash-back—boom times for the first six months; the accumulation of enormous inventories in expectation of continued peak load sales; the almost overnight cessation of business; and the precipitous drop in commodity and security prices. When the crash came, everyone experienced the freezing-up tight of a usually current asset. To say that inventories were a drug on the market is putting it mildly, for the simple reason that there was no market. When the accounts for 1920 were finally balanced, the quite generous profits of the first six months had suddenly vanished and in their stead appeared not only exceptionally large losses for the current period but indeed a great many surpluses were entirely wiped off the slate.

As with all experience that affects the pocket book adversely, this experience taught the business man a lesson of which he is still aware and one which no doubt he will remember for years to come. He has learned above everything else the lesson of taking every precaution against a *fatty degeneration* of the inventory. Since that time he has insisted that continuous effort be made at all times to avoid investing in inventory one cent more than is necessary adequately to meet sales demands. Such a policy has brought about many beneficial results, among which the following may be mentioned:—

1. A reduction of capital invested in inventory.
2. The release of such recovered liquid capital for other purposes.
3. The minimizing of losses due both to falling prices and to obsolescence occurring as the result of changing styles, types, models, etc.

4. Increasing turnover or the doing of equal or greater amount of business with a smaller inventory.

You may be interested in the following figures taken at random from published statements of representative and nationally known concerns:—

	Inventory		*Sales*	
Name	1925	1926	1925	1926
R. H. Macy & Co. (1-30-27)	7,680	7,860	66,505	75,470
B. F. Goodrich...	41,560	28,495	136,000	148,000
Union Oil Co.....	29,700	24,800	74,370	79,943
Borden Co.	7,690	6,600	123,300	124,900
U. S. Steel Co....	285,600	281,300	1,406,000	1,508,076
Bethlehem Steel Co.	69,170	68,440	273,025	304,360

These figures tell an interesting story. Apparently, these concerns are solving the problems peculiar to their own inventory conditions through a constant study of their individual needs and the adoption of every means which bring about a speeding up of the material cycle from procurement to disposal.

Unquestionably there are many who have accepted certain of the present inventory reductions as a natural course of events without in any way realizing that there has been at work during the past few years a large number of forces which have made it possible adequately to meet the enormous present-day sales with such comparatively small inventories. And while such forces are being employed to reduce inventories, it must be appreciated that the struggle is far from a one-sided affair. Opposition appears in the form of an increasing volume of sales. The latter naturally has the tendency to demand at least an adequate inventory of finished stock to meet delivery dates promptly. And as new sales methods are constantly being originated to boost sales to yet higher levels, there arises the problem of meeting one condition without the loss of control over another.

I will attempt in the following paragraphs of this section to discuss briefly several of the more important factors which act to reduce inventories, and at the same time, several factors—principally selling methods—which have the opposite effect.

NOTE: In above figures, thousands—000—are omitted.

Factors Effecting Inventory Reduction

Hand-To-Mouth Buying. Today is a period of hand-to-mouth buying. The corner drug store these days, does not send through its usual order of one gross. It is now cut to a dozen. Wholesalers and jobbers who have now become glorified retailers, pay their similar respects to the manufacturer. One manufacturer treats another fellow bag-holder with little modification of the above. Retailer, wholesaler, manufacturer, all have adopted this so-called hand-to-mouth buying method, this method of having on hand no more than is absolutely necessary to meet immediate sales demands. It is not unlike many of the descendants of Socrates who rush out the back entrance of their restaurants to the butcher in order to fill your order for two lamb chops well done. What are the causes? Just two:—

1. Playing safe in connection with any possible business recession.
2. A severe case of *turnover-gitis*.

But unfortunately the craze for turnover has in many instances brought about results just the opposite to those intended. This is due to a misunderstanding that turnover is synonymous with volume. So much has been written on the subject of turnover that many business men have not the slightest idea what it is all about. As a result many seem to be more interested in a percentage figure than in profits. A little thought, however, will demonstrate that a merchant may make ten turnovers a year and yet not make one-half as much actual profit as another who is turning his stock only five times. After all, actual profit depends primarily on volume. Therefore the one making a slow turnover may, however, be turning over a stock three or four times as large as the first merchant. Volume and inventories are the two determining factors of turnover. You can increase your turnover by letting sales remain constant and decreasing your inventory carried; or you can increase your sales and keep your inventory where it is. In the first case you increase turnover but not profits, in the second case, you increase both turnover and profit. It all depends upon whether you are more interested in percentages or profits. At the same time bear in mind that an inventory shaved down to too fine a point brings about lessening of profit through higher prices in fractional buying and loss of sales through incomplete stock.

Transportation. But a few words need be mentioned in connection with transportation as affecting inventories. First, we all appreciate the fact that the minimum limits of our purchased raw materials and supplies in stores are established principally from two factors—rate of consumption and time to replenish. By shortening the latter, it is possible to set our minimum quantities at lower points and thus decrease our inventory. Better transportation service during the past few years has helped to shorten the time from release of purchase order to receipt of goods. The motor truck especially has done much in this respect. All along the line transportation service has been speeded up and made more dependable. So much for external transportation.

Within the plant itself, we have witnessed during the past few years remarkable changes in material handling. The slow, costly and laborious hand moving of material from process to process has given way to an endless array of automatic and semi-automatic devices. In some plants the human hand never touches the product in its course through the factory. It seems hardly necessary to point out that any saving of time in processing an article reduces proportionately our inventory of work-in-process. Material handling machinery, along with a long list of advantages to the pocket book, certainly has done its part to speed up the material cycle and thus keep inventories down.

Budgetary Control. The past five years or so have seen the adoption of the business budget by quite a few progressive concerns. It is unfortunate, however, that the full import of its benefits has not been sufficiently appreciated by the business world to result in its more universal adoption as a medium of control. This splendid tool of management has of course left its mark on inventory. On this particular and important subject it requires the opening inventory, planned closing inventory, planned production, and naturally a purchasing program.

Under correct budget procedure, it is possible to maintain a close check of inventories, not as to the details, for that is a function of a proper material control system, but as to broad and controlling classifications. Through monthly comparison of actual with estimated, management is afforded a means for directing action to the end of increasing the inventory to take care of an increase of

sales, or to allow it to fall, through liquidation, when sales demand decreases.

Simplification and Standardization. All of us are more-or-less familiar with the elimination of waste as the result of simplified practice developed by American industry working in close cooperation with the Department of Commerce. These two matters offer such remarkable opportunities toward a reduction of inventory that several brief comments with respect thereto will not be out of place.

What is simplified practice? This question is answered very clearly in the primer of simplified practice published by the Department of Commerce. There it is stated "that simplified practice is a method of eliminating superfluous variety. It is applied by the collective action of producers, distributers, and consumers, with the cooperation of the division of simplified practice, to eliminate needless variety in sizes, dimensions, and types of commonplace commodities. This method is based on the sensible avoidance of waste caused by excessive and uneconomic diversity. Simplified practice decreases costs and increases the utility and efficiency of production, distribution, and consumption. These ends are accomplished by voluntarily limiting varieties of stock items to those for which there is a constant demand."

It may be of interest to learn what simplified practice has already accomplished in connection with several commodities:

Commodity	*Former Number of Sizes, Styles, Designs, etc.*	*Present Number of Sizes Styles, Designs, etc.*
Smooth Face Brick.....	36	1
Common Brick	44	1
Cultivators	45	8
Woven Wire Fence.....	552	69
Milk Bottles	49	9
Range Boilers	130	13
Paving Bricks	66	4
Grinding Wheels	715,200	255,800

The above are but a few of a large number of commodities to which simplified practice has been applied. The figures are in-

dicative of the malignant growth of special sizes, styles, designs, etc., which has attached itself to American goods and which has slowly been assuming proportions entirely too large for the continued welfare of business.

In condensed summary form, the following are a few of the advantages of simplified practice:—

DECREASES	INCREASES
Variety of sizes	Volume of Sales
Inventories	Turnover
Idle Investment	Working Capital
Seasonal Operation	Stability of Employment
Production Costs	Continuity of Operation

There appears to be a slight misunderstanding as to the difference between the terms simplification and standardization. The following taken from the Department of Commerce bulletin explains that difference:—

"Simplification and standardization are not synonymous terms. Each describes a separate and distinct process. Simplification is defined as the art of rendering simple, or making less complex, less difficult, while standardization is defined as the art or process of conforming to any measure or extent, quantity, quality, or value, established by law, general usage, or consent. To simplify is to limit variety to essential kinds and sizes. It may include grading of commodities. Standardization embodies simplification but carries the process into technical or scientific fields, so as to fix the basic mechanical or physical characteristics of the product, or process of its fabrication, or methods of tests."

In connection with standardization, a few of our larger and more progressive concerns have effected savings of no small consequence. For example, standardization methods at the General Motors Corporation have brought about important savings in the cost of parts, the storage space required, the labor of handling, the amount of inventory of stock carried, and the loss through obsolete parts. When the first book of standard parts was compiled by the General Motors, there appeared a list of 13,355 parts. When duplications had been eliminated and the minimum actual requirements determined, the same book listed only 2,099 parts. The first division of this corporation to complete the work of

standardization reduced the number of bins in its stock from 1,640 to 78.

Although these two factors offer nearly unlimited possibilities in connection with reducting inventories throughout the entire fabric of American business, it is safe to say that by far the greater number of concerns have given them little if any consideration. Opportunities such as these are too good to be overlooked. It has been well stated that "if you cannot apply simplification to things you sell, then apply it to things you buy."

Improved Machinery & Processes. Successful efforts in mass or quantity production have resulted in a shortening of the time to process a product through the factory. As a natural result our inventories of work-in-process should decrease.

Almost daily, better and more productive machines are being placed on the market. Instead of requiring ten minutes to perform a certain operation as under old methods, but five minutes are now required with the new machine. Whereas it took sixty days to process an article from raw materials to completion, it now takes only thirty days. And, if production is 100 units per day, let us say, then under the first condition, 6,000 units are in process at all times as against 3,000 under the latter condition. The saving in inventory investment in work-in-process is thus quite apparent.

That there is to be no let-up in the machine improvements is evidenced by the following excerpt taken from a recent issue of *Mechanical Engineering:*—

"Machine designers are working night and day to beat the accuracy and output of present machines so why not cram the work through hard, get all that can be got out of it, and keep the proportion of productive output to overhead as high as possible. The International Harvester Co. was for crowding to a reasonable maximum because of the rapidity with which machinery becomes obsolete, and named two years as a favored time in which a machine should pay for itself. The S. K. F. industries also name two years."

In addition to improved machinery, recent years have seen many improved processes which have materially shortened the time between the raw state and the finished state. Another important development in manufacturing which conserves the inventory is

the more scientific determination of lot sizes. There are, of course, many other factors—scientific plant layout, better and quicker receiving, storing, inspecting, and shipping methods which time will not allow us to discuss. In summary, however, good shop management insists upon those arrangements which permit the uninterrupted flow of material in, through, and out of the plant in the shortest possible time consistent with standard quality of product.

Factors Tending to Increase Inventory

Installment Selling. One of the most important developments in sales methods during the past few years has been installment or deferred payment selling. While it is not a new method of selling, its full advantages were not realized until the last few years. In 1925, for example, it is estimated that the amount of installment sales in the U. S. exceeded six billions. One of the most essential features in connection with this form of selling is that of financing the sale. This has brought into existence a large number of finance companies, some of which are subsidiaries of the selling company and the others, of course, independent companies. But whatever the means of financing, this method of selling has brought about an enormous increase in sales, not otherwise possible. As a result of such sales demands, inventories have tended to increase to meet such demands. Consumer credit has increased by leaps and bounds, and is now almost as important as producer credit.

Recently, there has been considerable discussion as to the ultimate position of installment selling, but in spite of the criticism directed against it, the predominance of opinion is for it, provided proper restrictions are recognized and enforced.

Change in Style, Type & Design. The present era is one of style. Almost overnight the demand for a certain style, type or design ceases and in its place arises a demand for other styles, types and designs. All about us we witness a never ending array of these changes which unfortunately tend to increase our inventories. The one thing that will offset this condition is simplification, a subject which has been briefly described above.

National Advertising. Many concerns which five or six years ago advertised but little and then principally in trade papers are now national advertisers in the true sense of the word. Thus,

they have created nation-wide demand for their product, and in order to push their sales properly, have in many cases adopted a policy of selling direct to the retailer and consumer, rather than through the jobber or wholesaler. To carry out this plan of selling, it has been necessary to establish in various locations of the country warehouses to service such retailers and final consumers. As a natural consequence, their inventories of finished merchandise have been greatly increased. An important and associated feature of such warehousing is that of financing. Up to the present time it has been difficult for certain manufacturers to obtain credit on such scattered collateral. It may be of interest to learn that to overcome this obstacle, warehousing finance companies are being organized, to extend credit to those concerns making use of their warehouse facilities which will be located in various well chosen cities throughout the country.

Material Control

The five principal benefits resulting from the proper control of material are:—

1. Keeping the investment in inventories down to the lowest minimum consistent with production and sales requirements.
2. Preventing interruptions to production schedules and sales programs as a result of shortages in materials and merchandise.
3. Preventing and minimizing losses due to physical depreciation and obsolescences of stock.
4. Keeping working capital in a more liquid condition.
5. Obtaining at any time the amount of inventory for financial statements and administrative purposes.

For some reason or other, there are a few people who still believe that the principal object of a material control system is the elimination of the yearly or semi-yearly physical inventory. This particular feature is only one of the many by-products. Its principal objectives are the conservation of capital, an aid to production and the stabilization of profits. Mass production, a more rapid material cycle, and enormous sales demands have caused to be originated a method which affords at all times a clean-cut picture of inventory investment in its various aspects and a means for its correct administration.

It has been well said that the material ledger is the pivotal point in a material control system, around which turns a large number of vital forms and procedures. But this one record, no matter how well designed, will not alone make the system a success. There must be a well-conceived and well-operated method of ordering, purchasing, receiving, storing, issuing and shipping.

Let us see, however, what information the material ledger should give.

1. Quantity and amount of material still on order.
2. Quantity and amount of material received for any given period.
3. Quantity and amount of material issued for any given period.
4. History of all purchases and returned purchases.
5. History of all prices.
6. Record of vendors of material (for the small concern).
7. Balance of material on hand—quantity and amount.
8. Quantity of material reserved in advance of immediate requirements.
9. Quantity available for future requirements.
10. Quantity of material needed for unfilled and uncompleted orders (thus preventing shortages).
11. Record of slow-moving materials.
12. Record of obsolete materials.
13. Information essential for accurate cost accounting.
14. Information essential for proper planning and production.
15. Positive supporting data for the inventory controlling account.

Material Ledger. I am not going to spend time in discussing the advantage of one form of material ledger over another. Some are too limited in information, some too elaborate for the particular users, and others apparently just suited to the condition. However, I do want to bring out two classifications into which I believe any ledger form may be placed. The first is the form designed with apportionment features; the second without such features. In the first form, material is apportioned (or reserved on paper) before issue and the balance available may be at variance with the actual physical quantity on hand as distinct from the

second form upon which material is not apportioned and upon which the balance available is the actual quantity on hand. On this subject, Henry H. Farquhar says, "By setting aside on the sheet or apportioning the needs of an order in advance, and obtaining an amount available which includes both the amount in the storeroom and the amount on order, we are thus not only working ahead of actual issue requirements during a period which theoretically is covered as regards issue in the setting of the low limit, but also by working definitely to known needs we are keeping the amount of inventory to the lowest possible point consistent with safety."

Minimum & Maximum Quantities. Another matter in connection with the ledger form applies to minimum and maximum quantities sometimes to be found in material ledgers. Usually the quantities are not what the names imply. In other words, either the present limits have been incorrectly computed or the original figures, although once correctly computed, have never been adjusted to take care of changed conditions.

Theoretically, the minimum limit point of any material is that quantity which will be just sufficient to answer the requirements of: (a) Production, in the instance of a manufacturing concern or, (b) Sales, in the case of a retail or wholesale concern, during the period of time required to replenish the supply. Theoretically, also, there should be no maximum limits since such a limit should coincide with the minimum limit. Because the above two factors —time to replenish, and consumption of materials—are generally variable items instead of constants, the minimum limit adopted in practice is always greater than the theoretical minimum limit and the maximum limit exceeds the minimum limit. Unforeseen and uncontrollable delays in replenishing supplies and unforeseen increased demand for production or merchandise makes it necessary to establish, first of all, the theoretical minimum limit and then to increase such limit by the use of a factor of safety to a quantity which anticipates conditions of an adverse kind.

The establishment of a maximum limit presents a much more difficult set of conditions than in the case of a minimum limit. It is not uncommon to find in practice that maximum limits are either entirely omitted from the material ledgers or else based on guesswork. In some instances maximum limits are established

not on the basis of requirements but by reason of lack of storage facilities. In other cases the maximum limit is fixed to prevent the purchasing of excessive quantities when the market may be favorable for purchasing, say, six months' or a year's supply at one time. One large automobile company sets up its maximum limits on certain supplies on the basis of average consumption over a period of three months. At best, maximum limits are unsatisfactory and only in isolated cases are they of any benefit at all. The prevailing, but unsatisfactory definition of what a maximum limit is, seems to be that it is "the greatest amount of material which could be carried at any one time."

In operating material ledgers, the following should be an iron-clad rule:—

"No entry shall be made in material ledger unless the basis for an entry is a company form properly used and signed by the person or persons with authority to do so. Under no circumstances shall the basis for an entry be oral instructions."

A Recently Developed Tabulating Card-Ledger.—A method, which, because of its substantial economies and many advantages, is more and more being adopted by distributing concerns, is the unit plan. This method operates substantially as follows:—One tabulating card is prepared for each unit received into stock. In each card is punched description, commodity code number, date received, selling price and cost. Space is provided for information originating when the sale is made. Each card receives a consecutive number under its particular commodity grouping by means of an automatic numbering device which records at the same time the punching is accomplished. Thus if 100 units of a certain commodity are received, the first card is numbered one, the last, 100. These cards are properly filed in a tub file under its identifying index. If one unit is disposed of, the first card is drawn from the files. The cards remaining constitute the remaining inventory, and the card withdrawn can be used for preparing the billing. Under this plan, it is not necessary to count the cards when an inventory is necessary. Merely subtract the number of the first card appearing in the file from the last, add 1, and the result is your inventory. Hence, if 5 units have been sold (in the case above),

the number of the first card appearing will be 6, which taken from 100, leaves 94 plus 1, gives an inventory of 95.

Ordering, Purchasing & Receiving. A material control system, deserving of such a name, requires that all requests for the replenishment of materials either originate from the Material Control Department, or, if originating in another department, then pass over the material ledgers before any purchases are made. If proper minimum stock limits have been established and if the ledgers are both properly and correctly operated, information when to replenish should in most cases be easily obtainable from each material ledger sheet. Whenever the quantity of a material falls to the minimum limit point, information is thus afforded the clerk by means of which he can set into action such procedures as will result in the depleted stock being replenished with new material.

The minimum limit point, or the point at which steps should be taken to obtain additional material, may be either one or the other of the following two quantities depending upon the type of material ledger form being used:—

1. The actual quantity of material on hand in the storerooms.
2. The quantity of material available for future orders.

Where the ledger form has been designed without consideration for apportionments, the minimum limit is the actual quantity of material on hand in the storerooms, i.e., item "1" above; where the ledger form is designed for apportionments, the minimum limit is the quantity available, i.e., "2" above.

In every instance, however, it will not be possible for the ledger clerks to originate the purchase requisitions. Especially is this so when new material for new parts or new products—materials not already stock articles—are being purchased for the first time. Only the planning or production department in such cases can originate such purchase requisitions since they are the only ones to know exactly what kinds and quantities of materials are required for the new parts or products.

I shall not take time to discuss many of the necessary details in connection with operations of ordering, purchasing, and receiving, but instead will call to your attention the necessary forms concerned with these three operations which should pass over the

material ledgers in order that a positive control may be secured therefrom.

First, in connection with ordering, it has been stated that, "wherever possible, the computation of quantities for stock to start replenishing orders should be governed by a basic formula—this method allowing the delegation of the ordering to a less expensive clerical force than would otherwise be required. Such standardization enables us to control stock balances satisfactorily with a small force of ordering clerks, one clerk in some instances, controlling 500 to 1,000 separate items. While establishing more-or-less automatic control, it does not always meet the requirements of unexpected demands, but is in the main satisfactory for our purposes. Over-balanced stock conditions, while not always preventable, can usually be minimized by a careful study of the situation encountered and the application of a proper routine."

The following documents in connection with the aforesaid three operations are passed over the material ledgers:—

1. Purchase requisition.
2. Purchase requisition change—if any.
3. Copy of purchase order.
4. Copy of purchase order change—if any.
5. Vendor's invoice.
6. Notification of material received.
7. Work material received in stores form.
8. Received in finished stock form.

Monthly Inventory Investment Report. A complete monthly picture of the inventory investment is made possible through a monthly inventory investment report. This report is planned to show names of the various kinds of materials arranged in alphabetical order on the left hand side of the sheet, with the following columnar headings running from left to right:—

Inventory on hand at beginning of month.
Amount purchased, made, or transferred during month.
Amount consumed or sold during month.
Inventory on hand at end of month.

Should the number of material items be large, then a number of material classes should be established and shown on this report, rather than the individual items. I have a case in mind where

some 20,000 items used by a gas and electric company are now grouped into 58 classes. In this particular case, however, I believe this number of classes entirely too inclusive for proper control. This type of report can be made to show a complete monthly picture not only of raw materials, parts, and finished stock items, but work in process as well.

Those employing tabulating and accounting machines find the work of compiling such a summary rather a simple task as compared with hand methods. One tabulating card is used for each item. Punched in each card is the quantity on hand and the unit cost. Individual extensions are not necessary as all cards bearing the same basic price are automatically sorted together, the quantities likewise automatically added, and one price extension applied to each total.

This report of inventory investment prepared monthly, in my opinion, ranks second to none, as a means for current control. Fluctuations up or down may be noted at a glance, so that if it appears that purchases are getting ahead of consumption in respect to any particular class, immediate action may be taken to put the "screws" on somewhere along the line.

In a recent article by Mr. L. P. Alford on the laws of manufacturing management, there appeared the following laws of material control:—

1. The highest efficiency in the utilization of materials is obtained by providing the required quantity, of the required quality and condition, at the required time and place.
2. The highest efficiency in the storage of materials, tools, and supplies, is obtained by providing a definite place to store every item, keeping every item in its assigned place, and keeping an adequate record thereof.

In connection with these laws as now presented, Mr. Carl Bigelow, President of Bigelow, Kent, Willard & Company, comments to the effect "that during the past thirty years, it had been fairly safe most of the time to have some excess to everything on hand inasmuch as material prices were greatly rising. At the present time, however, with falling prices, it is necessary to limit all inventories to their absolute minimum and with this in view, pos-

sibly another corollary to the laws of material control should be added as follows:—

"Material inventories should be maintained at exact requirements during periods of falling prices, while speculative advantage may be taken in excess stock during periods of rising prices."

In my talk tonight I have tried to sketch the major considerations in a subject which in practice is quite complex. I trust that I have left with you two thoughts:—

1. That during the past five years in the face of changing conditions of distribution and marked increases in sales volume, we have been able to keep our inventories at low limits and under reasonable control at all times by the use of methods which prior to 1921 had little, if any, development.

2. In spite of our excellent record in the above respect, there is still much room for improvement. Only through the use of those means which we have failed to accept at the present time, will we bring about a true control of inventory investment during its entire cycle from purchase to disposal. A partial employment is not enough. Let us accept and use every possible means to bring about the greatest benefits.

Forge Shop Production—Cost Accounting

By

FRANK S. HATCH

Assistant Treasurer and Secretary, Moore Drop Forging Company, Springfield, Mass.

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

Additional copies of this Publication may be obtained from the office of the secretary. The price to members is twenty-five cents per copy and to non-members seventy-five cents per copy.

Vol 9 No 10

EDITORIAL DEPARTMENT NOTE

There is always a keen interest on the part of a considerable portion of our membership in the accounting problems, methods, and procedures peculiar to different lines of industry. While basic accounting principles are the same everywhere, their applications in given situations must vary in accordance with the circumstances of each case. To know how to apply them in a given instance is a part of the stock-in-trade of the professional accountant. We are glad to present as our current publication a paper dealing with cost accounting in forge shops. This paper was presented at the May, 1926, annual meeting of the American Drop Forging Institute and is reprinted from the Proceedings and Addresses of that body.

The author is Mr. Frank S. Hatch of the Moore Drop Forging Co., Springfield, Mass. Mr. Hatch is a Massachusetts product, having graduated from high school in Saugus and from the Burdett Business College. He was employed by Chamberlain and Company, wholesale meat dealers in Boston, from 1907 to 1910 as a bookkeeper; with the American Felt Company from 1910 to 1913 as head bookkeeper, traveling auditor, and cashier; with Scovell, Wellington & Company from 1913 to 1920 as an auditor, then as a cost accountant, and the last three years as manager of their Springfield, Mass. office, leaving that connection in May, 1920, to accept his present position with the Moore Drop Forging Company, where he is assistant treasurer, secretary and member of the Board of Directors. He is also secretary and a director of the Hampden Grinding Wheel Company and of the H. R. Huntting Company, both of Springfield.

For three years he was a member of a cost committee for the American Drop Forging Institute. The work of this committee resulted in the publication in 1924 in book form of the "Essentials of Drop Forging Accounting."

Mr. Hatch is a member and president of the Springfield Chapter, National Association of Cost Accountants.

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JANUARY 15, 1928

FORGE SHOP PRODUCTION—COST ACCOUNTING *

IT IS not the men sitting in this room who produce the forgings but the workmen straining and sweating at the hammers and before the fires, together with the other workers throughout the plant, who are the real producers. So if we are to attain that high number of pieces forged per day or per hour, that means successful and profitable operation, we must begin with an organization of well trained workers. Then that organization must be kept enthused through fair treatment and a proper contact that makes them feel they are considered as something more than just so many numbers on the time-clock list. We must secure not only their interested cooperation in carrying out present plans, but also their valuable suggestions for improved methods. Various systems of prizes and payments for suggestions are all right in their place but the important reward to hold out to the workmen is the assurance of steady employment and good pay.

An enthusiastic organization believing that nothing is impossible, and with confidence in the management, can do more than any other agency in turning out a high production, and they will take both pride and pleasure therein.

But the management does not receive and does not deserve this confidence of the workmen unless the officials of the company know their jobs and their business. Not only must they know the actual manufacturing processes intimately, but particularly if the business is a large one, there must also be adequate methods of planning and control of production and costs.

To secure satisfactory production there must be a proper layout of equipment and routing of materials to conform to the sequence of operations. Forgings run into tonnage very fast and efforts expended in handling and trucking that might be eliminated run into wasted dollars equally fast.

Design of Dies Important. The correct design of dies is also important, especially to the forge shop engaged on long runs. This includes such matters as the number of impressions in the dies to

* Reprinted from Proceedings and Addresses May, 1926, American Drop Forging Institute.

give the longest life and the possibility of forging multiple parts at one time on small forgings.

A forge shop must have workmen and equipment to operate at all, and they are the most important factors, but it is also necessary to have a sensible statistical control. If your plant has a carefully calculated set of burden rates, you know how many dollars per hour it costs to run a hammer, and even if you have not gone into this matter scientifically, you know that it costs enough. On any particular job you know that the hammer must produce a certain number of pieces per hour if that job is to return a fair profit.

I hope you will excuse a personal trend in many of the following paragraphs, but it seems advisable to draw my illustration from the methods of my company, not necessarily because they are the best, but because I will be on safe ground by so doing.

Daily Statement of Forge Shop Production. Our first useful statement for production control is a "Daily Statement of Forge Shop Production" delivered to the proper officials early each forenoon, covering the previous day's production on each hammer. This shows the number of hours the hammer was engaged on productive work, the forger's name, the job or die number, and the number of pieces produced. This statement has more value from the corrective standpoint on long runs, which last for days and even weeks, than it has on short runs, which can be completed in a few hours. It is distinctly up to the forge department superintendent, foreman, and the forger to get satisfactory production on very short runs, as they are completed before the office receives any record.

In connection with this report we prepare a daily "lost hours report," accounting for all lost time on each hammer under some 20 standard reasons, such as, "repair hammer," "repair die," "set die," "change hammer board," etc. These two reports give the general manager and superintendent a clear picture of what transpired in the forge department the previous day. These reports are summarized weekly and special weekly reports prepared, calling particular attention to all long run jobs, which show an average hourly production below the estimated production. These reports are compiled by the cost department, and sent to the general manager, superintendent, production clerks, foremen, in fact, to everyone interested.

In the foregoing illustrations the forge department has been used as that is the key to the entire plant.

The pay-roll is analyzed weekly and ratios of pay-roll to production; non-productive to productive labor; etc., are calculated. By getting out these and other reports promptly, the management has an opportunity to correct any weaknesses before it is too late. These are some of the most useful statements for control of production.

Cost Accounting Systems. Now for the cost accounting. Of what use is a cost system anyway? Absolutely none unless you use it and use it intelligently. If you fill your cost department with clerks who operate a lot of mechanical appliances and fill nicely ruled cards with prettily formed figures, which are filed away, and never looked at or used, you had better fire the entire cost department. For a cost system that is not used has practically no more value than no system at all and is much more expensive.

But if you plan your cost system carefully and with a generous application of common sense, adapt it to the real needs of your business and forego the frills and non-essentials, and then use the results of the cost department's work, you will have an invaluable tool to use in the conduct of every phase of your business. The more current this information is, the more useful it will be. Cost accounting that is ancient history is of little use in running a business.

Cost accounting undoubtedly was originated for the purpose of determining the cost of an article in order to set a selling price. That is still one objective, but it has many more. You have heard much in late years about budgets. Perhaps you budget the financial requirements of your business. Your cost system budgets your manufacturing activities and sets up standards against which you check your actual performance.

Allow me to vary my question. Of what use is our cost system? In connection with sales, it helps us estimate on new business, it enables us to calculate an exact cost on every job produced, while we are producing it, and determine a fair selling price although we cannot always get it. It furnishes an intelligent guide to profitable and non-profitable business. In manufacturing it furnishes us with an operating budget for every expense item and

every department or burden center in our plants, and every month it checks our actual performance against that estimate, and our actual production by departments against a corresponding estimate. It controls our inventories. It enables us to prepare complete and correct financial statements every month covering the operations of our entire business and have them out on or before the fifteenth. With a cost system tied in to the general books, we know the cost of every sale and can prepare a correct profit and loss statement; we have control of our inventories and can prepare a correct balance sheet.

There are other important uses. Our financial connections know that once a month we have dependable figures, in other words, that we know our own business and, over a period of years, we have built up in their minds a feeling of confidence in us, our cost system, and our statements.

A short time ago, the superintendent for one of our fairly large customers wanted his directors to put in their own drop shop. Superintendents sometimes like to take on more responsibility or take more power into their own hands. This man honestly thought that the purchase of a few hammers and a small outlay for auxiliary equipment would complete the program. We wrote out for them a complete statement of all the tangible things required to do their own forging and mentioned all the intangible ones we could think of. The superintendent and one of his officers then visited our office and were shown our cost system. They were also shown actual cost cards on their jobs, and they decided to stay out of the forging business.

Cost Figures Available. For years it has been our practice to lay our detailed cost figures on the table when discussing new sales prices with our customers.

These are some of the things our cost system does for us. You may be interested to know how we secure these results.

The total cost of any manufactured commodity is, like classic Gaul, divided into three parts—Material, Labor and Burden. The material is easy to record and is posted directly to our cost card (a sample of which is used as Form 24 in the book published by the American Drop Forging Institute in 1924) from a daily report of steel delivered to the hammer. We calculate a separate job cost for every order or for every lot when a large order is put

through the plant as several smaller lots, as we believe that the job cost method furnishes the best information for our business.

The direct labor expended on the job is posted from daily time cards to the proper columns on the cost card. There is a column for each operation showing the date, hours worked, pieces produced, and wages earned. A comparison of the pieces reported on each operation and posted in these parallel columns, which are also checked with the amount of steel delivered to the job, furnishes a splendid check on the accuracy of the daily time card count. On some operations, such as pickling, sandblasting, heat-treating, etc., the labor cannot be posted directly from the time card to a particular job, and so is combined with the burden into a process rate and applied to the product treated at a rate per hour, per hundred pounds, or whatever seems the logical basis for that operation.

Overhead Expenses. The proper amount of overhead expense or burden to charge to a job is more difficult to determine and more complicated to apply. We start our budgeting of manufacturing burden with a carefully worked out burden development. Our forging plants are divided into about 30 centers each. Land and building factors are calculated and apportioned to burden centers on an equitable basis. Drop hammers and presses, motors and generators, machine tools, shafting, pulleys and belting, pipe and fittings, in fact all fixed assets are allocated to the burden centers and the fixed charges thereon, interest on investment, taxes, insurance, depreciation and repairs to buildings, are estimated and charged to the respective centers. The total cost of steam, electric power, compressed air, etc., is calculated and apportioned to the departments using these items on the basis of consumption. Indirect labor is estimated for each burden center by reviewing past records and allowing for any changes in wage rates and probable changes in operating schedules. The supplies used in each center are determined in about the same way and allowing for any general trend upward or downward in commodity prices. The same with repairs to machinery and equipment. The general factory expense, that is supervision and plant administration including production, cost and payroll departments, is distributed to the productive centers at a rate per employee. Certain miscellaneous expenses peculiar to a particular department or bur-

den center are then calculated. We have now set the estimated burden or expense budget of every burden center classified under the following headings:

Indirect Labor,
Supplies,
Repairs and Maintenance of Machinery,
General Factory Expense,
Fixed Charges,
Redistributed Expenses,
Miscellaneous Charges.

These charges are then added and the total operating expenses divided by the estimated productive capacity of the center, expressed in pounds, hammer hours, or whatever the logical basis may be to give a rate at which to apply the burden earned to the product passing through the center. In other words, for every hour that a hammer or a press or any other piece of equipment is working on a particular job, we charge that job with burden at the normal hourly rate for that center.

We have now posted to our job cost card the material, labor, process charges and burden. We then apply the die charge at a rate per forging estimated to extinguish the cost of the dies when they are used up. I have heard of quotations based on costs without any die charge. In one case the drop forging manufacturer "didn't see why he should include any die charge as he already had the dies."

In this paper I must keep away from too much detail and only hit the high spots. We now total all charges on the job cost card, deduct the forgings scrapped from the total pieces forged, and divide the total cost by the good pieces to determine the manufacturing cost per piece. This information in summary form, together with the selling and administrative cost, selling price and profit (or loss) is then transferred to a master cost card, which is our comparative record of all orders or lots produced on that particular piece. This is a most valuable record.

In describing this master card before a meeting of cost accountants, a while ago, I ran into trouble. We photograph one of every piece we make and mount a small picture on the master cost card. Its value is obvious. Thinking entirely of metal products, like

ours, I made the rash statement that all cost departments could use photographs of their product to advantage. One of the men present was the comptroller for a big ice cream plant, and he spoiled my party entirely by asking, "How about ice-cream?"

While discussing the application of burden to individual jobs, I mentioned the estimated burden or expense budget, which we prepare for each center. We control the actual expenses as follows. A ledger sheet is opened for each burden center on which is a separate column for each of the expense classifications mentioned a few minutes ago, and also columns for total burden, earned burden and unearned burden. At the top of each column is entered in colored ink the estimated amount or budget of that particular item for a month. The actual charges to every center whether from the payroll distribution, journal entries, material and supply requisitions, or direct from the distribution of purchase invoices are posted to the proper columns on their respective burden ledger sheets. At the end of the month the ledger sheets are added and each column then shows the actual monthly total of that particular expense item in comparison with the estimated amount at the top of the column and also in comparison with the total for previous months. This gives the cost department all the necessary material to prompt an investigation of any items that appear to be out of line. In fact a cost clerk, if he is working with his brain instead of simply posting mechanically should note these discrepancies as he posts them. If the "supply" column shows an estimate of $200 per month and for several months that item averages about $200 and then jumps to $400, he knows that something is wrong and should investigate it immediately and report to his officers.

Revising Burden Rates. With the information divulged by the burden ledger and some knowledge of the future scale of operations it is a simple matter to revise burden rates when necessary. The rates should not be revised whenever there is a temporary fluctuation in expenses or production. They should be set for a fairly long swing and revised only when the fluctuations show a constant trend in one direction.

The cost of operating a hammer or any other machine for an hour is definite and does not vary between jobs and the hourly

rate should not be lowered when applied to a poor job or increased when applied to a good one. You would not think of reducing or increasing the amount of steel charged to a job, depending on whether it was a bad or a good one, so why take such liberties with the burden?

After the burden ledgers are added and balanced at the end of the month, a burden report is prepared for each of our plants. This statement lists the numbers and names of the burden centers down the left edge of the sheet and has columns from left to right for the above classes of expenses, also for total actual burden, scheduled burden, variance, earned burden and balance unearned. For the benefit of the men in the audience who are not familiar with these terms may I explain that burden variance is the difference between the estimated burden and the actual debits; the earned burden is the amount credited by multiplying the actual production—hours, pounds, or pieces—by the burden rate; and the unearned burden is the difference between the actual debits to the center and the amount earned.

This unearned burden represents a loss from unused capacity and is charged directly to profit and loss. In our opinion the product made during a certain period should not be loaded with the expenses of that period resulting in a high unit cost when production is low and a low unit cost when the volume of production is high. The forgings turned out on a certain hammer are being produced just as efficiently as ever though the hammer beside it is shut down for lack of work. That idle hammer does not increase the unit cost of forgings made on the busy hammer. It does however fail to earn its fixed charges and the lost capacity is a direct charge to profit and loss.

This burden report gives the management at a glance the results in each center and the totals of the above items for all centers or departments in the plant for the month, and as these reports are prepared in about ten days after the close of a month, the information is live enough to be of some use. It is not ancient history.

Statement of Expenses and Production. We then prepare another set of statements, a report for each burden center showing the individual totals for each class of expenses for all months to date in comparative form and also in comparison with the estimate. This statement also shows the actual production for each

month expressed in pounds, hammer hours, or whatever the basis may be together with the estimated production. We now have a detailed statement of expenses and production for all centers for each month and a statement for each center for all months to date. The latter appears to us to be a more useful statement than one showing merely cumulative figures to date. The cumulative statement shows total estimated and actual expense over a certain period of time. You can average this total by months but for any further detailed information you must go back over the individual reports for each month. How much better it is to have the figures for every month in comparative form.

I have endeavored to tell you "How We Do It." You naturally want to know "Does this method work?" Most emphatically it does. We have had this plan in effect since 1914. Naturally there have been many changes and revisions but we are still working on the same fundamentals. Our knowledge of these burden operations accumulated over this period of years enables us to budget expenses fairly accurately for a stated amount of production and set very close rates.

All of these activities may seem to you both complicated and expensive but the actual cost of both salaries and stationery for our cost department is one-third of one per cent of our gross sales.

Just one last plea and I will finish. Our executives are always hot on my trail for reports a few days before we can possibly have them ready and the questions, which I am asked to answer shortly after the statements are distributed, show that they are used. We believe that a cost system is absolutely essential to the profitable conduct of a drop forging business. For the ultimate success of every man in this room, I hope that you agree with us and also that you recognize the importance to our industry of uniformity in our cost accounting fundamentals. Please note carefully that I do not say uniform costs, for there is no such thing. A particular forging made in two different plants of the same company does not show the same cost; nor are the actual costs ever the same on different runs in the same plant. What we need is uniformity in methods of costing and estimating to make sure that all expenses—even depreciation and die charges—and a fair profit are included when we quote on a job. And then we need the courage to abide by these figures and stop forcing each other to give away forgings in order to secure business.

Co-ordinating the Factory and General Accounting to Insure Prompt Monthly Closing

By

JOHN E. HORN,

Comptroller, Bakelite Corporation,

New York, N. Y.

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

Making the information in the accounts readily available for use by the company's executives is one of the most important problems facing the accounting executive today. It is essentially a production problem. The current publication deals with the method used by the Worthington Pump and Machinery Company in handling this matter and will be found suggestive to all executives facing a similar situation.

The author, Mr John E. Horn, was educated at the Central High School of Philadelphia and at the Wharton School of Finance, University of Pennsylvania. Among the first business positions held by him was that of office manager and cost accountant for the Springfield Worsted Mills, Bordentown, N. J., in charge of the accounting and office procedure. After seven and a half years with that company, he accepted a position with Geo. W. Swift, Jr., manufacturer of special machinery for the manipulation of paper, located in the same city, where he installed the accounting system for that company and served as office manager and cost accountant. After five years with the latter comany, he accepted a position with the American Pulley Company of Philadelphia, serving in the capacity of general accountant. He resigned his position in 1917 and served in the Army as a Major in the Sanitary Corps of the Medical Department until 1919, when he accepted a position as General Auditor of the Worthington Pump and Machinery Corporation, where he extended his experience in the cost and other accounting problems in that industry up to April, 1927. At that time he accepted a position with the Bakelite corporation, of which company he has since been made Comptroller.

He joined the N. A. C. A. shortly after it was organized, has served as director in various capacities, and later as President of the New York Chapter during the season of 1925-1926. This paper was delivered before the January, 1927, meeting of the Buffalo Chapter, N. A. C. A.

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CO-ORDINATING THE FACTORY AND GENERAL ACCOUNTING TO INSURE PROMPT MONTHLY CLOSING

IN THE presentation of this subject I would first mention the industry with which I am connected—The Worthington Pump and Machinery Corporation—in which the prompt monthly closing is now a systematic occurrence. We have at the present time five operating plants, widely separated, where a great variety of machines and products is manufactured, yet controlled from the Head Office in New York. It might be well to mention some of these products as this will enable you to visualize the extent of the work performed and help in the understanding of what is being accomplished along accounting lines to insure prompt monthly closings.

I will only mention the principal products and call attention to the fact that the greater part of the output is special as to size and design, necessitating the use of job costs, an important point to be borne in mind in following the course of this talk. At our Cincinnati plant we produce Compressors, Diesel Engines at Buffalo, Pumps at Holyoke, Diesel Engines, Locomotive Feed Water Heaters, and Pumps at East Cambridge, and Pumps, Condensers, Meters and a large variety of other products at Harrison, N. J. From the variety mentioned—and a large number not mentioned—it is apparent that the range of completed products runs as to size from the large Diesel Engine to the small Water Meter. Nevertheless, we have established a standard accounting procedure for all Works which are governed by the rules contained therein, augmented by specific requirements as to the performance to meet definite dates of completion.

There are two principal factors entering into the accomplishment of prompt monthly closings, namely, The Organization and The System. Each of these will be treated separately.

The Organization

Before outlining the Organization as applied to our own industry, it might be well once more to mention the principle we must all recognize, viz., that a good organization with a poor system will no more turn out the desired results than a poor organization with a good system; they must both be well founded.

Granting you have both, there must still be the compelling authority which furnishes life to the organization, with the will to do, the system furnishing the means of accomplishment.

Organizations will vary according to the requirements and scope of the industry. I am merely using our own industry as an illustration to show its relation to the operation of the business and its contribution to the accounting work entering into the monthly closings.

The President is in complete charge of corporation matters, supported by three Vice-Presidents in charge of Finance, Manufacturing, and Sales, all of whom are located at the Head Office in New York.

The Vice-President in charge of Finance has full supervision over financial affairs, embracing the work of the Treasury and Accounting Departments, over which the Treasurer and Comptroller preside.

The Comptroller is the head of the Accounting System, with full supervision over the Head Office, Works and Branch Office accounting.

The Office Manager at the Works, while co-operating with and subject to the orders of the Works Manager, is subject to the orders of the Comptroller, insofar as accounting procedure is concerned.

The Vice-President in charge of Manufacturing has full supervision over Engineering and Manufacturing, embracing the production at all Works. Each Works has a Works Manager who reports directly to the Vice-President in charge of Manufacturing at New York, and is responsible for the entire operations of the Works. Under his supervision we find the Works Superintendent, Chief Engineer, Office Manager and others who function in connection with various phases of the work. It will be noted that the Works Manager has no jurisdiction over the distribution of charges, nor in any way over the accounting procedure, although he is consulted on all matters pertaining to the system.

The Vice-President in charge of Sales has full supervision over all Branch Offices and Sales Departments. The Branch Office Sales Managers and heads of the special Sales Departments report

through the General Sales Manager to the Vice-President in charge of Sales.

It is of course understood that all departments co-ordinate for the good of the whole.

I have sketched the top of the organization to give a general picture and at the same time point out those responsible for the accounting procedure, the thing in which we are particularly interested. You will note that there is a direct contact between the Office Manager, or the Chief Accounting officer, at the Works and the Comptroller at New York. It is this direct contact without interference that is a contributing factor in the results obtained of which I will speak later.

The Head Office Accounting Department is divided into the Sales Ledger, Purchase Ledger, Disbursement, Statistical and General Ledger Sections, all functioning under the supervision of the General Auditor, who reports directly to the Comptroller and is the co-ordinating officer between the Works and Head Office and is responsible for the compilation of the monthly balance sheet and income statement and the work incident thereto, both at the Works and at Head Office.

Under the Office Manager at the Works, we have the Purchasing, Stores, Order Record, Cost, Billing, Traffic, Mailing and Filing, and Cashier Departments, all with specific functions to perform in connection with the accounting procedure.

The Branch Office accounting is comparatively small, consisting of a weekly report to Head Office reconciling an imprest fund out of which petty cash disbursements have been made and recording the warehousing and sale of consigned stock as transactions occur.

I might elaborate further on the detailed duties of those responsible for the work incident to the accounting system at Head Office, Works and Branch Offices, but believe from the foregoing you have the structure of the organization.

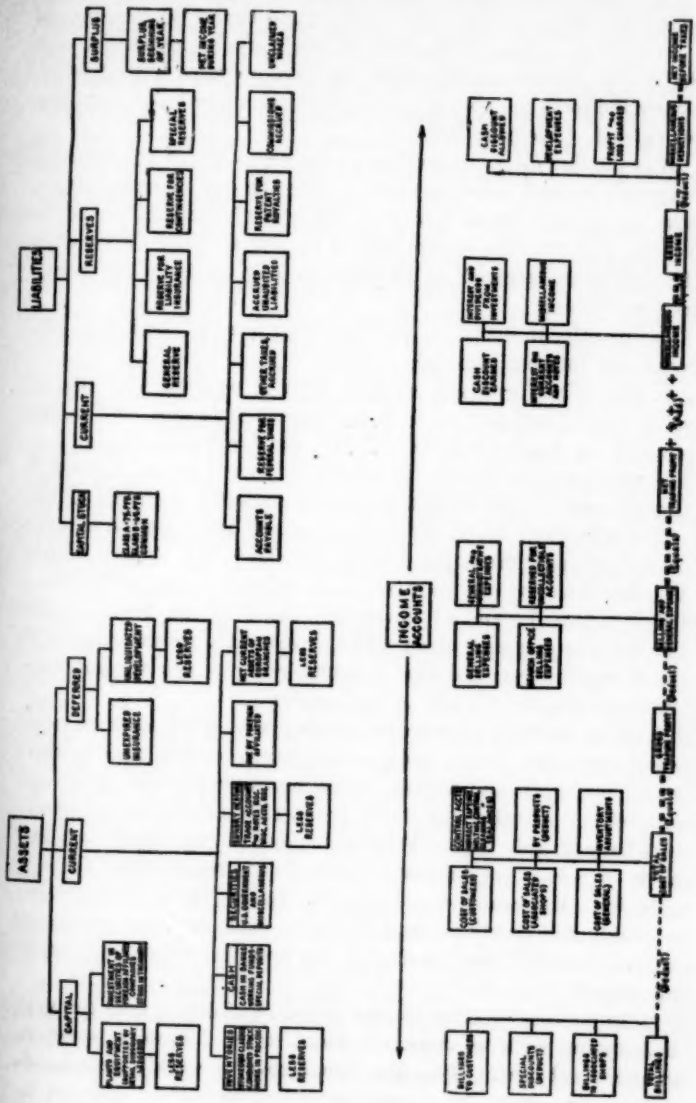
The System—At the Works

I will divide this subject into two distinct phases, the procedure at the Works and that at the Head Office and will endeavor to show how the work is co-ordinated to insure prompt monthly closings.

The Works accounting system provides for twenty-six control accounts, which are carried in a Works Ledger, and through which are recorded all transactions accounting for the three elements of manufacturing cost, i.e., material, labor, and indirect expense. For purposes of segregating the elements entering into some of the control accounts mentioned, there are approximately twenty-five other accounts which are used during the month, but closed out currently to their respective control accounts. The control accounts are:

1. Iron Foundry—Melting
2. " " —Cleaning and Chipping
3. Brass Foundry—Melting
4. " " —Cleaning and Chipping
5. Inventory—Stores—Group A
6. " " " B
7. " " " C
8. " " " D
9. " " " E
10. " " " F
11. " " " G
12. " " " H
13. " " " J
14. " " " K
15. " " " L
16. " " " M
17. Inventory—Consigned Stock—Machines
18. " " " —Parts
19. " —Work in Process—Material
20. " " " " —Labor
21. " " " " —Indirect Expense
22. " " " " —Partial Billings
23. " " " " —Reserves
24. Works Indirect Expenses
25. Head Office
26. Labor Control.

The corresponding control accounts are contained in the General Ledger at Head Office. Through the medium of Works Journal Vouchers, the monthly transactions and the turnover in-


LIABILITIES
SURPLUS
RESERVES
CURRENT
CAPITAL STOCK
ASSETS
DEFERRED
CURRENT
CAPITAL
INCOME ACCOUNTS

cident thereto are reported and summarized in the Works Reports.

In order to visualize the flow of the work in connection with the Works Accounting procedure, we have prepared a chart which clearly indicates the course of the principal elements of manufacturing cost. (See page 597.)

It is the flow of work incident to the recording of the material, labor and indirect expenses entering into the cost of manufacture, how we compile these figures at the end of each month at the Works, and how the information is treated at Head Office when the reports are received, which concerns us in attaining the prompt monthly closing.

Let us refer to the chart, and trace the course of the Labor, Material and Indirect Expenses.

Labor. Each works is given an imprest working fund, out of which payroll and petty cash disbursements are made. All weekly payrolls are charged to Labor Control and credited to Head Office. The amount disbursed by the Works is entered on the Record of Charges and reimbursement is made immediately by Head Office.

The salaries of the Works executives and others on the monthly payroll are paid from Head Office by check. A Works Journal Voucher covering the total of these salaries is issued by Head Office before the end of the month, charging the Works Labor Control and crediting Head Office, a summary of the charges to the Works Indirect Expense accounts by hours and amount being shown on the reverse side of the voucher.

Various methods of wage payments are in effect, such as piecework, premium, bonus, gang co-operative, departmental co-operative, day work and others, which necessitate variations in the methods of distribution, all of the details of which are hardly necessary at this time. Wherever possible, an effort has been made to reduce the number of labor tickets required for this distribution. For example, no tickets are issued for the clerical force, a weekly and monthly summary being made by indirect expense account directly from the payroll, for entry on the monthly working papers.

In the case of other classes of indirect labor, where the work is constant, such as crane operators, crane followers, sweepers, cleaners and others, the labor tickets cover a weekly distribution, which summarizes the charges according to indirect expense ac-

count. Similar methods are also used in the distribution of certain classes of direct labor, such as the labor charged to the Melting and Cleaning Controls.

Tickets covering all other direct labor are forwarded to the Works Office daily for all completed operations. After being checked as to price by the Piece-Work Department, they are extended as to labor cost, and the indirect expense applied on each ticket using machine-hour rates.

The tickets are then forwarded to the Cost Department, where they are punched, tabulated for verification of the punching, sorted, and tabulated for entry on the daily summary of labor, and charged to the Work-in-Process, Indirect Expense, Melting and Cleaning Controls, after which they are filed by order or account number.

Material. The Stores Accounts are divided into eighty-five classifications, which are segregated under twelve groups composed of kindred items, each group having a control account. All requisitions for, and disbursements of, stores, whether manufactured or purchased, clearly indicate the proper classification, thereby enabling us to secure the information necessary for building up the controls by class and groups entering into the monthly turnover, as contained in the Stores Classification Reports No. 2-A to D, to be mentioned later.

Invoices for the purchase of materials and supplies, all of which are forwarded directly to the Works, are entered on the Record of Charges. A copy of the report, together with a copy of each invoice or voucher listed thereon, is forwarded to Head Office daily. At the end of the month, a summary is made charging Works Stores by classifications and groups and crediting Head Office for the materials purchased either for stock or for orders.

Casting tickets are issued daily by the foundries covering the castings produced on each order. The Casting Receiving Station verifies the quantity received with the information on the tickets and extends the total weight on each ticket. The tickets are then forwarded to the office, where they are extended as to value, punched, and tabulated for entry on the daily summary of castings, thereby providing the monthly charges to Work-in-Process Control and Indirect Expense Control, with the corresponding credit to the Melting Control.

A complete file of disbursement tickets, prepared in advance

from addressograph plates, is carried for all items on the stores ledgers. These tickets contain all the necessary information other than order number and quantity.

When orders are issued, the tickets are drawn, the order number and quantity filled in, and the disbursement tickets then accompany the routing tickets to the shop. No hand-written tickets are honored by the Stores Department.

All tickets for disbursements made from stores are forwarded daily to the Works office, and are entered on the stores ledgers before the close of the following day, and a daily control set up to cover all transactions, printed working paper being provided and used for accumulating the daily transactions for the month. The tickets are then forwarded to the Cost Department where they are punched, and follow the same procedure as that described for the Labor distribution.

Indirect Expenses. A standard chart of indirect expense accounts for all works has been provided, accompanied by an explanation in detail of the items chargeable to each account and shop department. Charges to these accounts include indirect labor and material, previously mentioned, and fixed charges.

Detailed Works Plant and Equipment Ledgers are maintained at Head Office, supporting in detail the Plant and Equipment Controlling Accounts on the General Ledger, and provide a means of setting up the necessary reserves for fixed charges consisting of Depreciation, Insurance and Taxes. A Works Journal Voucher covering the total of each charge is issued by Head Office before the end of the month, charging the Works Indirect Expense Control and crediting the proper Head Office reserve accounts. A summary of the distribution of these charges to specific Works Indirect Expense accounts and departments is shown on the reverse side of the voucher.

As stated before, the indirect expense control is relieved of the normal burden on the basis of machine-hour rates.

Preparation of the Works Reports. As orders are shipped and billed, they are listed by invoice number, shop order number and amount on the daily List of Sales Orders Billed, and a copy of this report, together with one copy of each invoice listed thereon, is forwarded to Head Office. The accumulated billing amount is carried forward until the end of the month. Further reference to

this report will be made in connection with the system at Head Office.

A tabulating ticket is made out by the Billing Department for each order entered on the List of Sales Orders Billed, showing the order number, invoice number, date, billing amount, weight, territory, class of machine and whether part or final billing. These tickets are punched and tabulated daily to prove with the total billing amount as shown on the daily List of Sales Orders Billed, and are then forwarded to the Cost Department with the folders containing the original copy of the order, specifications, copy of invoice and all other correspondence pertaining to the order.

The cost tickets are then taken from the files, checked with the specifications, tabulated, and the cost entered on the analysis tickets. The cost information is then punched, after which the analysis tickets are accumulated in a file until the end of the month, when they are tabulated according to territory and class of machine, to furnish the information for the Analysis of Billings by Class of Machines, and Analysis of Billings by Territory reports, and the relief of the Labor, Material and Indirect Expense in the Work-in-Process Controls.

Consignment orders are treated in a similar manner, using a Consignment Billings analysis ticket to distinguish this class of orders.

When stock orders are reported as completed, the quantity received by stories is entered on the stock ledgers, and the orders listed on a Report of Stock Orders Closed, two copies of which are forwarded to the Cost Department as their notice of the closure and as a request for billing. Cost tickets are taken from the files, tabulated, and the cost entered directly on the Report of Stock Orders Closed, one copy of which is returned to the Stores Ledgers for posting of the cost value to the stores accounts.

A summary of the total closures for the month by stores classification, as well as by labor, material and indirect expense is made by the Cost Department for the purpose of relieving Work-in-Process and charging Stores.

The cost tickets, representing expenditures on capital and development work, and sundry charges to Head Office, are tabulated at the end of the month, when Work-in-Process is relieved, and the corresponding charge made to Head Office.

The accumulation of tickets representing indirect expense charges for the month are sorted and tabulated by account number, and the total value is charged to the Indirect Expense Control, with the corresponding credit to the Labor and Stores Controls.

The Melting Control is relieved of the total weight of *all castings* produced, good and bad, as shown on the daily summary of castings, with a corresponding charge being made to Work-in-Process. The scrap value only of bad castings is credited to Work-in-Process and charged to Stores, resulting in the orders absorbing the cost of defective work.

The Cleaning Control is relieved of the total direct hours of coremaking and molding at a predetermined standard cleaning rate, and the corresponding charge made to Work-in-Process.

The accounting entries recording the transactions mentioned are contained in a standard set of nineteen printed works journal vouchers, showing all the information required with the exception of the amounts which are inserted by hand.

It might be stated that the work of closing is arranged to allow the Cost Department the maximum time limit for the closing of orders, so that after the receipt of the final cost, approximately three hours are required to complete the final typed reports ready to be forwarded to Head Office.

It might be well at this time to mention the monthly reports, numbers one to twenty-two, inclusive, and explain briefly their scope. With the exception of the Working Fund Reconciliation, all of the information contained in these reports is taken from the working papers, or analysis of billings tickets, resulting in a quick summarization at the end of the month.

No. 1-A, B, C, D. Working Fund Reconciliation. This report contains a summary of the working fund turnover, showing the balance in bank and on hand at the beginning of the month, the receipts and disbursements during the month, and the balance at the end of the month, supported by a bank statement. Schedules are provided to show the outstanding advances, items in transit, and the outstanding checks.

No. 2-A, B. C. D. Stores Classification. This report records the inventory turnover, balance first of month, receipts, disbursements and balance end of month, in dollars, by class of product.

No. 3 Report—Stores Summary. This report contains a summary of the receipts and disbursements to and from stores for the month.

No. 4 Report—Consigned Stock. This report contains a summary of the receipts and disbursements of consigned stock, showing machines and parts separately, for which control accounts are maintained.

No. 5 Report—Work-in-Process. This report contains a summary of the receipts from and disbursements to Work-in-Process under the headings of Material, Labor and Indirect Expenses, and also records the transactions affecting partial billings and reserves. Control accounts are maintained for Work-in-Process Material, Work-in-Process Labor, Work-in-Process Indirect Expense, Partial Billings and Reserves.

Reports 6-A, B. Works Indirect Expenses. These reports provide for showing in detail the charges to each indirect expense account in each department, and the total. Cumulative reports record the expenditures for the period.

Report 6-C. Works Indirect Expenses Summary. This report provides for redistribution of the indirect expense charges of the non-productive to the productive departments, showing the charges after re-distribution.

It will be of interest to note the following basis used in distributing the total expenses of the non-productive departments to the productive departments:

General and Office. The total expenses are distributed to all other departments on the basis of the total operating hours of each for the month.

Garage and Stable. The total expenses, plus the share of General and Office, are distributed to the other departments on the basis of the service rendered. Where the service is general, the distribution is made on the basis of the total operating hours of each department.

Power Plant. The total expenses, plus the share of General and Office and Garage and Stable expense, are distributed to the productive departments on the basis of the estimated power consumption, or on the actual power consumption, if metered.

Engineering Department. The total expenses, plus the share of General and Office expenses, Garage and Stable expenses and

Power Plant expense, less the amount absorbed on direct labor, or in other words, the unabsorbed Engineering Department expense is charged entirely to the Machine Shop.

Pattern Shop. The total expenses, plus the share of General and Office expense, Garage and Stable expense, and Power Plant expense, less the amount absorbed on direct labor, or in other words, the unabsorbed Pattern Shop expense is charged entirely to the Molding and Coremaking Departments of the Foundries on the basis of the estimated average maintenance cost of standard patterns (chargeable to Molding) and standard core boxes (chargeable to Coremaking).

Miscellaneous Department. The Iron Foundry. Miscellaneous Expenses are redistributed to the Iron Foundry Melting, Coremaking, Molding and Cleaning Departments on the basis of the total operating hours of each. *The Brass Foundry.* Miscellaneous expenses are redistributed in the same manner to the Brass Foundry Departments. *The Machine Shop.* Miscellaneous Expense is redistributed to Machine Shop-Machining, Assemble, Erect and Test, Tool Room, and Other Departments, on the basis of the total operating hours of each.

The operating hours used in the redistribution are obtained from the No. 14 Report, to be mentioned later.

Report No. 7—Works Indirect Expenses Control. This report records the indirect expense charges by operating departments, for the month and period, after redistribution, and also shows the over- or under-absorbed indirect expense in each operating department, the net total of all departments being in agreement with the Works Indirect Expense Control Account.

Report No. 8—Melting Cost—Iron Foundry. This report records the melting cost for the month and period and shows the metal used by class of metal, the metal produced, both good and bad castings, the cost of melting by elements and the cost at the spout of total castings, as well as good castings.

It further shows the total charges, total credits and the over- or under-absorbed balance which is in agreement with the Melting Control Account.

Report No. 9—Chipping and Cleaning Cost—Iron Foundry. This report records the chipping and cleaning cost, and shows the

direct labor by class of work and indirect expenses by account. It further shows the total charges, total credits and the over- or under-absorbed balance which is in agreement with the Cleaning Control Account.

Report No. 10—Cost of Output—Iron Foundry. This report is purely statistical and records the total cost per ton of good castings, broken down into the cost of good castings at the spout, coremaking, molding and chipping and cleaning, showing both direct labor and indirect expense. It also provides for the output per hour of good castings per coremaking, molding and chipping and cleaning direct labor hour.

Report No. 11—Melting Cost—Brass Foundry.

Report No. 12—Cleaning & Chipping Cost—Brass Foundry.

Report No. 13—Cost of Output—Brass Foundry. These reports record the same relative facts pertaining to the Brass Foundry as disclosed by the corresponding Iron Foundry Reports.

Report No. 14—Payroll Data. This report is purely statistical and records the total payroll, and direct labor, hours and amount, for all departments, both productive and non-productive. In addition thereto are shown the total payroll cost per hour, and per direct labor hour, as well as the number of days operated and the number of employees, both on total payroll and on direct labor, on the basis of an eight-hour day.

Report No. 15—Charges to Capital and Development Appropriations. This report records capital and development charges divided according to material, labor and indirect expense, showing the appropriation number, works order number and the proper capital account to which the charges should be applied. This report supports in detail the charges to Head Office as provided for on the No. 5—Work-in-Process—Report.

Report No. 16—Charges to Burden Appropriation. This report records indirect expense charges divided according to material, labor and burden, showing the appropriation number, Works order number and Indirect Expense account number, as well as the particulars incident to the expenditures. This report is purely statistical.

Report No. 17—Sundry Charges to Head Office. This report records special entries from the Works chargeable to Head Office,

with the particulars thereof to assist in the proper allocation of the expenditures.

Report No. 18—Monthly Trial Balance. This report lists all the Works controlling accounts and records the balance first of month, balance end of month and the net turnover during the month on each account. From the information contained on this report, the General Journal Voucher is prepared, reflecting the monthly changes in the Control accounts.

Report No. 19-A, B, C—Analysis of Billings by Class of Machines. This report contains a summary of the gross trading profit of each class of product, showing the billing amount, normal shop cost, normal profit per cent of shop cost, and the weight net tons, for both the month and period. Each Works is provided with forms containing their special products. All forms, however, are identical as to the method of presenting the information.

Report No. 20—Analysis of Billings by Territories. This report contains a summary of the gross trading profit of each sales territory, showing the billing amount, normal shop cost and the normal profit per cent of shop cost for the month and period.

Report No. 21—No-Charge Orders Completed. This report records in detail the No-Charge Orders completed, showing the order number, name of customer, particulars of the work performed, or material furnished, the department responsible and the amount. Included in this report are service charges rendered without solicitation.

Report No. 22, Thousand Dollar Orders Billed. This report records the comparison between the actual and estimated per cent of gross trading profit on all orders with a billing amount of $1,000 or over, showing the billing amount, shop cost, and profit per cent of cost, both estimated and actual.

The signatures of the Paymaster, General Storekeeper and Chief Cost Clerk are required on the specific reports for which they are responsible, and in addition thereto all reports bear the signature of the Works Manager and Office Manager. Reports are forwarded without delay to Head Office on the ninth working day following the month's closing.

The calendar year is covered by twelve monthly reports, some, however, representing four and other five-week periods, as the

monthly operations are closed on the Saturday of the last full week in the month, thus avoiding split payroll periods.

The closing dates and the expected arrival of the monthly reports for the entire year are set in advance and the Works so notified. These dates must be met and the Works plan their work accordingly with this end always in view.

It will be noted from the foregoing procedure that the operations at the Works are directed under what might be termed the central control of a decentralized cost accounting system.

The System—At Head Office

While the work incident to the monthly closing at the Works is being performed, the Accounting Department at Head Office is, during the same period, completing the transactions which can be taken care of prior to the receipt of the Works Journal Vouchers and Reports, preparatory to the monthly closing.

The Sales Ledger, Purchase Ledger, Statistical and General Ledger Sections of the Accounting Department at Head Office each have specific functions to perform, and it would be well to show the relationship of their work to the Works Accounting Procedure as contained in the reports prepared, daily and monthly, by the Works and received at Head Office for specific use in the divisions of the Accounting Department just mentioned.

The Sales Ledger Section. The Sales Ledger accounts are contained in four card ledgers arranged according to the following divisions of the alphabet A—D, E—J, K—P, and Q—Z, each of which is represented by a control account in the General Ledger.

When the daily List of Sales Orders Billed, together with copies of invoices listed thereon, are received in the Sales Ledger Section, the invoices from each Works are sorted according to the proper sales ledger and are entered by invoice number and amount on a list which is attached to each group of invoices. These lists are totaled, the totals entered on a control sheet maintained for that purpose, and verified with the total appearing on the List of Sales Orders Billed. No totals, however, are entered on the lists, which, together with the invoices attached thereto, are turned over to the operators for posting to the customers' accounts.

The bookkeeping machines, which accumulate the postings, are

cleared by posting the total to a control card maintained by each operator, which is verified daily with the control set up.

Cash received is entered on Cash Received Vouchers by the Treasury Department daily, and the vouchers forwarded to the Sales Ledger Section for verification with the customers' accounts, after which they are entered on a list by voucher number and amount. These lists are totaled, the totals entered on a Control Sheet and verified with the cash received as recorded in the Cash Received Book by the Treasury Department for the day.

Postings are made direct from the Cash Received Vouchers by the operators and the total postings accumulated on the bookkeeping machines are cleared to control cards and verified with the controls set up.

Controls are likewise maintained for cash disbursed, and other entries on the Sales Ledgers affecting the Purchase Ledger and General Ledger.

At the end of the month, the control sheets are totaled, and the Billings, Cash Received, Cash Disbursed, Purchase Ledger and General Ledger totals entered in the control book, which provides control accounts under the headings mentioned for each of the four divisions of the Sales Ledger, and these control accounts agree with the corresponding accounts in the General Ledger.

Billings at all Works are closed on the twenty-fifth day of each month, and the final invoices, together with the summaries of the List of Sales Orders Billed, which accompany the final list for the month, are all received at Head Office not later than five days following the closing of the billings. The total of the summary submitted by each Works is verified with the monthly control, and a General Journal Voucher immediately prepared recording the billings for the month and the charges to the respective Sales Ledger Control accounts. This work is completed prior to the receipt of the Works Reports.

The Purchase Ledger Section. The Purchase Ledger Accounts are contained in four card ledgers arranged according to the same divisions of the alphabet as the Sales Ledgers, namely, A—D, E—J. K—P, and Q—Z, each of which is represented by a control account in the General Ledger.

When the daily Record of Charges, together with the copies of the invoices and other entries listed thereon, are received in the

Purchase Ledger Section, the invoices and other entries are vouchered and filed by due date according to the terms of payment. Wherever possible, approvals are placed on the face of the invoices and entries, otherwise approval slips follow as soon thereafter as possible.

The distribution of the entries to the proper ledgers is noted on the Record of Charges sheet. The total of the postings to each ledger is entered on a control sheet maintained for that purpose. The total of the postings to the four ledgers is verified with the total appearing on the Record of Charge Sheet.

The operators post direct from the Record of Charge sheet and the bookkeeping machines, which accumulate the postings, are cleared by posting the total to a control card, which is verified daily with the control.

In addition to the charges from the Works, invoices are received at Head Office covering General, Administrative and Selling Expenses, which are entered in a Purchase Journal and distributed therein according to the proper ledger. The total of the charges to each ledger for the day serve as control accounts.

The Purchase Journal is turned over to the operators for posting the charges to the proper ledgers. The total of the postings to each ledger is cleared from the bookkeeping machines to control cards and is verified with the controls, which are set up in the manner mentioned in the preceding paragraph.

Controls are likewise maintained for Cash Received and entries affecting the Sales Ledger and General Ledger.

Cash disbursed is recorded in the Cash Disbursed Book by the Treasury Department and distributed according to the proper ledger control. The total for each ledger is set up as the control for the day's postings.

The Cash Disbursed Book is turned over to the operators for posting. The total of the postings is cleared from the bookkeeping machines to the control card and verified with the control set up.

At the end of the month, the control sheets are totaled, and the Purchases, Cash Disbursed, Cash Received, Sales Ledger and General Ledger totals are entered in the Control Book, which provides control accounts under the headings mentioned for each

of the four divisions of the Purchase Ledger, and these accounts agree with the corresponding control accounts in the General Ledger.

The final Record of Charge sheet, together with the summary, must be received at Head Office not later than one week following the closing of the report month. The total as shown by the summary is verified with the Controls as set up for each division of the Purchase Ledger and the necessary credit to each ledger made when preparing the General Journal Voucher, which summarizes the month's operations, of which mention will be made later.

The Purchase Journal is closed on the fifth day of the succeeding month, the charges summarized, and a General Journal Voucher prepared recording the entries to the respective General, Administrative and Selling Expense accounts, and the corresponding entries to the Purchase Ledger, Sales Ledger, and General Ledger accounts. This work is completed prior to the receipt of the Works Reports.

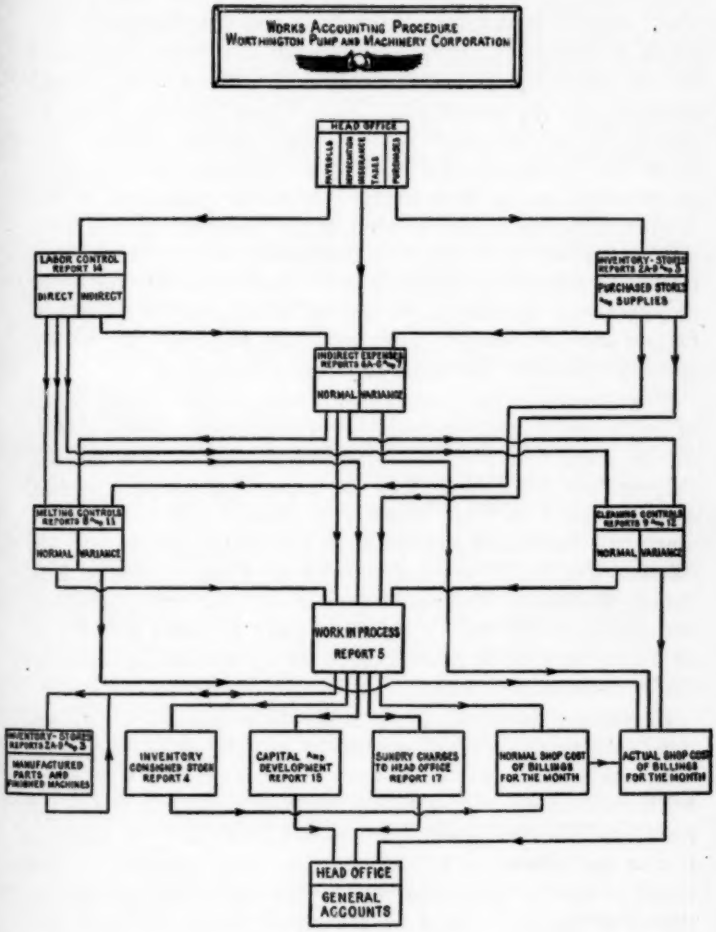
It will be noted from the foregoing that a daily control is maintained for both Sales and Purchase Ledgers, providing a constant verification of current work.

The General Ledger Section. The General Ledger is divided into four main groups of kindred accounts, namely, Plant and Equipment, Inventories, Income and Expense, and Sundry Assets and Liabilities, as this arrangement permits a number of persons to work on the General Ledger at the same time and thus helps to expedite the monthly closing. (See page 611.)

In addition thereto, six subsidiary ledgers are maintained as follows, and contain the detailed accounts as indicated in the name of the ledgers: Plant and Equipment, General Administrative and Selling Expenses, Personal accounts, Commissions, and the Sales and Purchase Ledgers previously mentioned, all of which are represented by control accounts in the General Ledger.

It is important to note that the accounts contained in the General Ledger are arranged in the sequence in which they are used when preparing the Balance Sheet and Income Statement.

Entries in the General Ledger are made from General Journal Vouchers on which all transactions are recorded affecting the General Ledger accounts.


WORKS ACCOUNTING PROCEDURE
WORTHINGTON PUMP AND MACHINERY CORPORATION
HEAD OFFICE
PAYROLLS
DEPRECIATION INSURANCE
TAXES
PURCHASES
LABOR CONTROL REPORT 14
DIRECT
INDIRECT
INVENTORY - STORES REPORTS 2A-B-C No. 2
PURCHASED STORES No. SUPPLIES
INDIRECT EXPENSES REPORTS 6A-B-C No. 7
NORMAL
VARIANCE
MELTING CONTROLS REPORTS 8 No. 11
NORMAL
VARIANCE
CLEANING CONTROLS REPORTS 9 No. 12
NORMAL
VARIANCE
WORK IN PROCESS REPORT 5
INVENTORY - STORES REPORTS 2A-B-C No. 3
MANUFACTURED PARTS AND FINISHED MACHINES
INVENTORY CONSIGNED STOCK REPORT 4
CAPITAL AND DEVELOPMENT REPORT 15
SUNDRY CHARGES TO HEAD OFFICE REPORT 17
NORMAL SHOP COST OF BILLINGS FOR THE MONTH
ACTUAL SHOP COST OF BILLINGS FOR THE MONTH
HEAD OFFICE
GENERAL ACCOUNTS
1918

In order to simplify and expedite the work incident to the closing each month, standard working papers are prepared at least a week in advance of the closing, consisting of the following forms: Trial Balance, Distribution of General and Administrative Expenses for the month and period, Distribution of Selling Expenses for the month and period, Distribution of Branch Office Selling Expenses for the month and period, Gross Trading Profit by Works. Information such as the column headings, names of accounts and the figures affecting previous periods, when required, are provided for on these papers. After the completion of the month's work, each sheet is given a dash number, such as 12-1, indicating sheet No. 1 of the twelfth month, and they are filed in a folder in numerical sequence and are always available for reference purposes. In addition thereto, the Sales Ledger and Purchase Ledger control sheets, together with the working copy of the monthly report, are numbered and filed with these papers.

The accounts on the Trial Balance form, following their order in the General Ledger, are arranged in sequence according to their use in connection with the entries appearing on the monthly Balance Sheet and Income Statement and are segregated in groups, each designated by a key number, the total of each group representing an item on the Balance Sheet and Income Statement. For instance, Key No. 1, which appears on the Balance Sheet as Real Estate, Buildings, Machinery, Equipment, Patterns, Drawings, etc., represents the total of the Plant and Equipment accounts of all works, covered by approximately eighty separate accounts on the Trial Balance.

In addition to providing the usual debit and credit columns, there are six additional columns on the Trial Balance arranged for debit and credit entries under three headings, namely, Key Number Extensions end of month, Key Number Extensions end of last period, and Current Month Increase and Decrease. The information in the column headed Key Number Extensions end of last period is filled in at the time the working papers are prepared, so that when the trial balance for the current month has been completed and proved, the extensions are quickly entered in the columns headed Key Number Extensions end of month, and the Current Month Increase or Decrease. Thus the Trial Balance forms

show the exact figures which appear on the Balance Sheet and Income Statement, and it is only a matter of transferring the information.

It will be seen that the arrangement of the Trial Balance Forms helps to a considerable extent in saving time and greatly simplifies the method of obtaining the figures which enter into the Balance Sheet and Income Statement.

The other working papers mentioned are used principally for the distribution of charges to the proper Works, and for statistical purposes.

A schedule of the usual monthly entries at Head Office not affected by the Works Reports, such as accruals for interest, taxes, insurance, development expense and other items, is maintained for the purpose of guarding against the omission of any of the current monthly entries. These entries are prepared in advance of the receipt of the Works reports, checked with the schedule, posted and verified.

The Treasury Department prepares a General Journal Voucher covering cash received and cash disbursed for the current month, which is received in the Accounting Department not later than the second day of the following month, and the entries thereon are immediately posted to the proper accounts in the General Ledger.

All entries affecting the Plant and Equipment accounts in the General Ledger are made and proved prior to the receipt of the Works Reports, with the exception of the current Addition and Improvement charges, which are included in the Works Reports.

All entries affecting the General, Administrative and Selling Expense accounts, personal accounts and commission accounts are likewise made in the General Ledger prior to the receipt of the Works Reports.

It will be noted that all possible entries have been made at Head Office prior to the receipt of the Works Reports, and posted to the General Ledger.

Working papers have been prepared and every available figure entered thereon, which leaves only the journalizing of the Works operations for the month when the reports are received.

The Works Reports, when received at Head Office, are immediately referred to the General Ledger Section. The control bal-

ances appearing on the General Ledger are verified with the corresponding opening balances appearing on the Works Reports, and the month's operations for each Works are journalized, approved and entries made in the General Ledger.

After the Trial Balance has been taken and proved, the computations and extensions are made, as previously mentioned in the explanation of the arrangement of the Trial Balance Form, and the necessary figures transferred to the Balance Sheet and Income Statement, known as the Monthly Report.

The No. 1-A, B, C, D Working Fund Reconciliation Reports, and the No. 19, 20, 21 and 22 Reports covering Analysis of Billings by Class of Machines, Analysis of Billings by Territories, No Charge Orders Completed, and Thousand Dollar Orders Billed, are turned over to the Statistical Section, as these reports are purely statistical and are not required in the preparation of the closing entries.

The Statistical Section. When the No. 19 to 22 Reports, just mentioned, are received in the Statistical Section they are immediately placed in folders and released through the Comptroller for presentation to the Executives, with appropriate notations attached thereto, drawing attentions to items of special interest, or, when the occasion requires, they are presented in person with explanations.

As soon as the necessary entries have been made by the General Ledger Section from the other Works Reports, they are immediately released to the Statistical Section, where the information reflecting the operations for the current month and period is immediately entered on reports contained in folders, which present comparisons from month to month, averages for the previous period, as well as cumulative results for the current period.

The forms used in the presentation of statistics are prepared in advance in most instances, which saves time in the quick preparation of the statistical information.

In addition to the reports furnished to the Executives, a number of which are enumerated below, comparative statements of the operations of the five Works are prepared covering Iron and Brass Foundry Costs for the Month and Period, Indirect Expenses for the Month and Period, and Payroll Analysis Data. These state-

ments are completed and released from Head Office on the day the final report from the Works is received. Many special reports are also prepared, upon request.

Iron and Brass Foundries.

- Iron Foundry Output and Costs for each Works.
- Brass Foundry Output and Costs for each Works.
- Comparative Iron and Brass Foundry Reports issued to Works Managers.
- Foundry Statistics—showing consumption of raw materials.

Indirect Expenses.

- Indirect Expenses by Department and by Accounts.
- Power Plant Charges.
- Unabsorbed Indirect Expenses.
- Comparative Indirect Expenses sent to Works.

General, Administrative and Selling Expenses.

- Selling Expenses.
- Branch Office Selling Expenses.
- General and Administrative Expenses.

Inventory.

- Inventory by Groups.
- Inventory Increase or Decrease by Groups.

Analysis of Billings.

- Analysis of Billings and Costs by Class of Machines.
- Analysis of Billings and Costs by Territories.
- No Charge Orders Completed.
- Thousand Dollar Orders Billed.
- Foreign Billings and Costs.
- Net Weight—Tons.

Appropriations.

- Additions and Improvements to Capital and Development Appropriations.
- Charges to Indirect Expense Appropriations.

The work incident to the monthly closing at Head Office consumes two full days after the receipt of the Works Reports, so that allowing nine days for the completion of the work in preparation of the Works Reports, and the preliminary work at Head Office during the same period, with a day for the mail delivery

from Works to Head Office, all told twelve days are consumed in completion of the Monthly Reports.

It will also be noted that the detailed information pertaining to the Works operations is available for the Works Managers not later than the ninth day of the following month, and the statistical information obtained from the Works Reports is in the hands of the Executives on the day following the receipt of the last Works Report.

The results obtained in securing a quick monthly closing are in proportion to the conscientious, diligent work of the organization at the Works, with the support of similar effort on the part of the Head Office organization, assisted wherever possible by quick decisions, when necessary, and the co-operation of the management in supporting the accounting work in general, plus that old adage of "keeping everlastingly at it".

The Analysis and Distribution of Sales Distributional Costs

By

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EDITORIAL DEPARTMENT NOTE

It is a matter of current knowledge that relatively the costs of selling the product are in most cases an increasingly large part of the price which the ultimate consumer has to pay for it. Economies in manufacture have long been the subject of endeavor and much waste and lost motion have been eliminated. Distributional costs are now being placed under investigation to see how and to what extent economies can be effected here. The author James H. Barrett, has been a leader in this new field of cost accounting and we are glad to present his views on this subject.

Mr. Barrett was educated at Northampton, Mass., High School and Cushing Academy, after which he spent a year at Dartmouth College. His first employment was with the New England Audit Company, Springfield Mass., after which he held the following positions: Cost Clerk and Bookkeeper, U. S. Radiator Corporation, Detroit; Ass't to General Accountant, The Detroit Edison Co.; Auditor and Ass't Treasurer, Doble-Detroit Steam Motors Co.; Auditor, Racine Manufacturing Co., Racine, Wisconsin; and the Kellogg Company, Battle Creek, Michigan, five years as General Accountant. Mr. Barrett is now Assistant to the Vice-President and Treasurer of the Kellogg Company. He is a certified public accountant of Massachusetts and Michigan and a member of the National Association of Cost Accountants. This paper was delivered before a recent meeting of the Chicago Chapter N. A. C. A.

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THE ANALYSIS AND DISTRIBUTION OF SALES DISTRIBUTIONAL COSTS

EACH concern represents a different problem. There are probably no two concerns in the United States that are exactly alike. If they sell the same kind of product, they have different types of organization, or they promote their sales in different ways. For instance, in our own line of business you will find our chief competitor handles his sales very largely through brokers, whereas we handle ours through district sales agents. So his problem, although in almost exactly the same line of business, is different from ours. Also, some firms sell only two or three products, or maybe they sell thousands of different kinds of products. And so, as problems differ, the results will differ and the perfection of results will differ. In some concerns one can only go half-way in arriving at a distribution of selling costs, whereas in some concerns one can go all the way. What I maintain, however, is this—that you can always go part of the way, and to go part of the way is a lot better than to go none of the way.

When I was here before I spoke about the Kellogg plan in order to prove that the idea was practicable. I explained how Kellogg's applied it to their business; but tonight, although, in order to carry out my line of thought, I will have to refer somewhat to Kellogg's, I will also refer to other firms in other lines of business to show you that the same principles that underly our particular application of it may be used in these others.

The subject tonight, "The Analysis and Distribution of Sales Promotion Costs," brings up the question—what kind of distribution do you mean? Do you mean distribution by products, or distribution by territories? I am presuming that it means both. However, first I will tackle the distribution by products, because I believe that is the more difficult by far of the two. When we consider distribution of selling expenses or sales promotional costs by territories, we must also consider as to whether we want to get it also by salesmen. That will come later.

With some concerns we have got to analyze our sales promotional costs by groups of products and not by individual products. In other concerns they can be analyzed for each individual product. You can hardly conceive an accounting system which would give

you sales costs for each single product of the Abbott Laboratories; and so my plan for a concern of that sort would be to divide their products into classes. A concern of that sort has a catalog. Their catalog could be used as a basis for dividing their products into classes, and then the costs could be arrived at by classes rather than by individual products.

First, in order to tackle any accounting proposition, you have got to analyze your problem, so first analyze your sales promotional costs and find out what the main elements are. I have listed them down this way: Advertising, sampling, special trade promotion plans, catalogs, personal salesmanship and order taking, dealer helps, and selling overhead. Of course there are others. Our friends in the specialized office equipment field have another element in the matter of surveys. If you decide that you want to use or you would like to use tabulating equipment, you go to either a Tabulating Machine Company's representative, or a Powers Accounting Machine representative, and he will come in and make a survey and tell you what he can do. That is another element of selling cost which I have not gone into tonight, because I believe if I set the underlying principles for the other seven which I have listed down here, the same will apply to any other expense we may have in any type of business. It makes no difference what the accounting problem may be, I have always made it a rule to ask myself, or to ask others, in attempting to decide what account or what product a certain item of expense should be charged to, what was the purpose behind the incurring of this expense? If I could determine the purpose, then I could tell the distribution very easily. I want to see if we cannot apply this rule to a very large part of this element of cost, the cost of selling. Let us take advertising first.

In the first place, space advertising is usually one of three types. It may be the one-product type, which is by far the most common. I don't think we ever saw an advertisement of the Brunswick-Balke-Collender Company advertising billiard tables and their music reproducing instruments in the same advertisement. I don't remember having seen Johns-Manville advertising their asbestos shingles or their fire-fighting equipment in the same advertisement. If you will think about the advertisements you have seen, you will remember that by far the great majority of them are of the one-

product type. Before coming over here, I went to my associate in the Kellogg offices, the advertising manager, and I asked him if there was much advertising done that was not of the one-product type, and he said there was very little, because advertisers and advertising agencies feel very strongly that where more than one point is handled in an advertisement, the punch is lost.

Now as this type of advertisement covers one product, there can be no question as to what product it is going to be charged to. However, when we come down to the type that handles a group of products, we must have some different basis of determining how much should be charged to one product and how much to another. I brought with me a few examples of advertising. Here is an advertisement of pianos manufactured here in Chicago, I believe. In that advertisement there is more than one type of piano mentioned; there are three types. However, the one type is predominant—the new invention of a particular kind of player-piano. Now if I were to attempt to distribute the cost of that advertisement over the three types of pianos represented there, despite the fact that the other two are mentioned, I would charge the cost of that advertisement against the new type of player-piano, because I believe that the advertising value to the other products is very negligible. If there was any question as to whether that was proper or not, I could soon find out by going to the advertising manager and having five minutes' talk with him, to find out what he was driving at and what he expected to get as a result of that advertisement.

Here is another type, in which Big Ben and Baby Ben are put side by side. Of course in that illustration Big Ben shows up a little more prominently than Baby Ben, because of the fact that it takes a larger illustration; but if I were to divide the cost of that advertisement, I would divide it half and half, because I believe the one type of clock gets just as much advertising value as the other. Again, if I were in doubt, I would go to that advertising manager.

Here is still another advertisement, Swift & Company, in which Brookfield butter, Brookfield eggs and Brookfield cheese are advertised. Most of you, gentlemen, especially those at the farther part of the room, in looking at that advertisement can see nothing but Brookfield butter, but in determining what I would charge the ex-

pense of that advertisement to, I would surely go to the advertising manager before I attempted to say. However, I believe the advertising manager would tell you to charge at least 80 per cent of the cost of that advertisement against the butter, because it is predominant in that advertisement. The other is merely casual.

There is another thing to be taken into consideration in the type of advertising that covers more than one product. We have to get at the purpose back of the advertisement. Supposing we saw an advertisement of the General Motors Company in which, in the same advertisement, they were covering Cadillacs and Pontiacs. How much of the cost of that "ad" would you charge against Cadillac? Personally I would not charge one cent of it that way, because I would not think it could be the purpose of the advertising manager to attempt to bolster the sales of Cadillacs by stating that they were related to Pontiacs; but I would feel the prestige of Cadillacs, long known to the automobile world, would boost Pontiacs; so if I saw a combination "ad" of these two, I would charge it all against the product being carried, because I believe that is the only basis on which an advertising manager would ever conceive of putting out such an advertisement.

There is a third type of advertising which we might call institutional advertising. We have some of it in my company. There are others that you know very well. For instance, you know the General Motors type. Every once in a while General Motors come out with an advertisement in which they advertise the family. I certainly should want to take the advertising manager into consideration there and find out what his purpose was, but I believe that he would tell me that his idea would be that the cost of that advertisement should be charged not pro rata to sales, not pro rata to sales value, but absolutely equally among all of them. There might be some of the elements contained in that illustration about the Cadillac and the Pontiac, so it might be that the advertising manager would tell me that he did not expect that advertisement would do the headliners as much good as it would do the Oakland and the Chevrolet and the others down at the lower end of the scale, but I think we would have to take the advertising manager into consideration. And if you have an advertising manager in your firm like the one we have in ours, he certainly would be very glad to help settle such a problem.

Then we have another kind of advertising, direct by mail, or package inserts, or something of that sort, that goes out direct to the consumer. I picked up a couple of samples of blank forms which Kellogg's get out for use in restaurants for the restaurants to print their menus on. Down in the lower corner is a little representation of Corn Flakes; up at the top it says something about Pep. Personally I would charge the cost of that advertisement half and half between the two, because I believe one received just as much benefit as the other. The same is true of another, where All-Bran is shown at the top and Corn Flakes at the bottom. Corn Flakes predominates a little, but I believe the carrying value of the Corn Flakes which is the better known of the products, would make that a proposition of an equal division of the charge between the two products.

Radio advertising, which is getting to be quite common nowadays—the Ipana Tooth Paste performances, the Philco Battery performances, etc., which all of us have heard so frequently—is institutional advertising in the majority of cases. In the case of some, for instance Philco, they mention several products. However, I believe the only thing you can do in such cases is to distribute the expense equally, not according to sales or sales value.

Then we come to another type of advertising expense—advertising overhead—the salaries of the advertising manager and his staff and the expense of running the Advertising Department. I am going to discuss that later along with Sales Department overhead, so we will leave it for the present.

Another element of selling cost is sampling. Now sampling, the same as space advertising, is very largely of the one-product type. It is not considered a good thing to sample two products at once, because you do not have the punch behind them that you do if you sample but the one product. If that sampling is of the one-product type, there can be no question as to how to distribute the cost. However, if a number of products are distributed at the same time as samples, we have to use a different basis.

Our cost of getting the sample out consists of two things: (1) the cost of the sample itself, and (2) and not least, the cost of distributing it. Oftentimes the cost of distributing it is more than the cost of the sample itself. I do not know how I would handle the distribution of your multiple sampling costs, if you have them,

because I do not know what your problem is, but if we should do it I would be inclined to divide that cost exactly pro rata to the number of samples distributed.

Another element of selling expense is special trade promotion plans. A short time ago there was one of these plans announced through an advertisement of the Eagle Pencil Company. They printed a facsimile of some of Thomas Edison's writing, and stated if you would send in a picture of the Mikado from a box of Mikado pencils, which could be purchased at your stationer's, along with 10 cents to cover the cost of mailing, etc., they would send you Louise Rice's analysis of Thomas Edison's handwriting, and also an analysis of your own scribbling. Now there can be no doubt as to what the Eagle Pencil Company should do with the cost of that special trade promotion plan. That special trade promotion plan was put out, without any doubt whatever, to boost the sale of Mikado pencils, and Mikado pencils should get the charge.

A short time back—several years ago—one of the flashlight manufacturers put on a contest for a name, and you will remember finally the prize was awarded to the person that gave the name "Daylo." Now that name Daylo has long since passed out of existence so far as I know. I know I have not seen it for several years, so I think the plan they had in mind at that time was merely to advertise their flashlight. Now I presume in that company, flashlights being only one of their products, they would have no finer distribution of their selling expense than the group covering flashlights, so that expense of course would go against flashlights.

Now I want to explain two special trade promotion plans of Kellogg's, because they are more familiar to me, and they have special problems involved, and I want to show how we make the distribution of expense involved. For three years, the Kellogg Company has been carrying on a little campaign whereby they inserted a little slip in their packages when they went through the packing machines, stating if you would send a small amount of money together with the tops from a certain number of packages, they would send you cloth dolls in bright colors, in sets, for children. As that campaign was not confined to any one product, how could we determine what that expense was to be charged to? Very simple. Our Advertising Department is so organized that when

those requests for dolls came in every request was tabulated, so that our advertising manager knew every week all of the varieties of requests that were made— whether they wanted one doll, or two dolls, or the whole set; whether they sent in stamps or coin; whether they sent in Corn Flakes package tops or All-Bran package tops, or what it was they sent in. We could go right back to our Advertising Department and find out what sales were being promoted, by counting the package tops that were sent in, and that is the way we distributed the expense. We might be a little bit wrong, but we certainly could not go far wrong in that.

This summer Kellogg's introduced a plan that we knew as the "5 to 1" plan. The plan was this: If a retail grocer bought from the jobber, who is our customer, five cases of Corn Flakes and one case of Pep, he was to send in the invoice that he got from the jobber or the wholesaler direct to us, and we would send him a check for the amount he paid for one case of Pep. Now that cost us a little less than $3.00 for every case of Pep that was purchased on that plan, and as you probably realize, it ran into a very large sum of money so there was a necessity for a quite accurate distribution of that cost. What basis did we use? We used the only basis we could. We used 5 to 1. They had to buy 5 cases of Corn Flakes to every one of Pep, so the sales of Corn Flakes were promoted five times to one for Pep, therefore the expense went 1/6 against the Pep product and 5/6 against Corn Flakes. Is there any other way in which it could have been handled, and handled in fairness to the two products involved? I mention these two plans in order to show you what can be done when special plans are put out. They always can be analyzed, the purpose back of them can be determined, and a fair basis arrived at for distributing the expense.

Next we come to the subject of catalogs. That is something that does not affect our firm at all; there are no catalogs on breakfast foods. With some of you it probably is a very large item. Not ever having had the problem put up to me, I am not sure as to how I would handle it, but I believe it is practically a question of the space taken by the various products or groups of products. However, there are two things that would modify that somewhat. One is the fact that certain products might be given preference in that they received color pages, or another product might be given

an advantage because the illustrations were much more profuse; but the question of your color expense can be settled along those lines, taking your advertising manager into account as before, and a fair distribution of that expense charged against the products or groups of products involved.

We now come to a section of the subject, I would say, that is more difficult, and I am approaching this classification of selling expense with less confidence than any classification we have stated so far, and that is personal salesmanship and order-taking. How can you distribute the expense of the salesman who is going around selling his products, so as to get a fair amount against each product? If we go back to the old way of doing things, we will find out that the entire selling expense was pro-rated according to sales value. That is the old method. Factory costs were determined in a fairly exact manner, so that the gross profit was divided by products fairly accurately, but when selling expenses were distributed, it was entirely pro-rata to sales value. Now I think I have shown you in considerable detail how a large part of that expense of advertising, sampling, etc., can be distributed fairly accurately between products. Is the method of pro-rating according to sales value the only method we can use in distributing the cost of personal salesmanship and order-taking? I believe not. In fact, with most concerns having more than one product to sell, certain of their products are going to be harder to sell than others. Certain of their products are sold on merit. Certain of their products are sold on a price basis. There certainly should not be as large a portion of the selling expense assigned to the products sold on a price basis as to the products which are hard to sell and which take real salesmanship to put across.

So it is very similar to that which we had in the matter of advertising. We should not attempt to settle such questions merely as accountants. Every organization is made up primarily of three departments, the financial department, the production department and the sales department. They should cooperate for accounting purposes just as well as they should cooperate in other ways; and so in this case where we consider personal salesmanship and order-taking, we must go to the men that are handling that part of the work—the sales manager and his assistants—to find out how that expense should be distributed.

In my own company, the method we employ for distributing that expense is this: The direct expense that is incurred in our branch offices is under the control of the district sales manager. The district sales manager in each territory gives his opinion as to every single item of each week's expenses, because the expense report for every week should be distributed. We don't, however, always go by this; we get his opinion though, and then modify it to meet special conditions that we may see but he does not. However, he is not often over-ruled, because usually he knows; he is the man who is out there in contact with the individual salesman. He is the man that knows what is going on in his territory. He knows how much time it takes to sell one product in comparison with another; and so if anybody can give us a fair idea of how the expense should be distributed, the district sales manager can.

And then we have the matter of selling overhead, that part of the selling expense that the district manager cannot control; and who is there that is better able to tell us the purposes back of the expenditure of money in that department than the sales manager himself? And by getting his side of the story, we can get a pretty fair idea as to what would be an equitable basis. I know of cases in our own organization where that has been modified somewhat, but it is a rare thing. And so I say that in the matter of the expense of personal salesmanship and order-taking, the same method should be employed of going to the man who is in authority and asking for what purpose the expense was incurred. Not only in our line but in almost every line, when salesmen go out to the dealer, the retailer, the man who is going to sell the goods to the public, they often help him by trimming his windows, by decorating his shelves, by helping him to make counter displays, etc., and that expense can be divided into two parts, the same as sampling; (1) the material involved, and (2) the expense. As far as the material is concerned, it is very easy. For instance, we have what we call a lock-end carton. It is made up to be put in the dealer's window, with the ends that lock, so it can be set up like that (illustrated), or it may be set up like this. We divide the material cost exactly even; one product does not get more value than the other, so we charge half to Pep and half to Krumbles. That is very simple.

Here is another one, a little more complicated. This problem

is similar to that in space advertising. There is no more benefit to Corn Flakes there than to All-Bran—just half and half; but if we were going to divide according to the old method, Corn Flakes, representing maybe two-thirds of our sales, would get two-thirds of the expenses; All-Bran, representing say 25 per cent, and those other products that are not covered at all in that piece of display material would get their pro-rata expense. That certainly would not be fair. The only basis you can use is to get right down to your display units and divide the cost of every one of them according to the advertising value contained therein.

Then there is the expense involved in making these window trims, etc. We first find out what material cost there is in making the window trim, and divide our expense accordingly. It might not be exactly right, but it would be pretty hard to get at it in any other way; and so we distribute our expense pro-rata to the material cost of making the trim, and come out fairly accurately.

Now comes the last of the seven items of selling expense—selling overhead, and as I told you before, I am going to consider advertising overhead at the same time, because the principle involved is exactly the same. Our selling overhead is made up of two things, salaries and office expense. I believe that the office expense follows absolutely pro-rata to the salaries. There might be some firms where it did not, but I believe that in the majority of firms we would find that the expense would work right in with the salaries as far as distribution between products is concerned. Now if we handled it on the old basis, we would distribute that expense pro-rata to sales value. That is no more fair than it is to do so in other forms of selling expense, because there are certain products which have, through a number of years of operation, attained a certain momentum. That momentum helps to carry them. It is the newer products that require more of the attention of the sales executive and his staff. So how are we going to distribute that overhead? In the same old way. We go to our sales executive, to our advertising executive, and we say to him, "How much of your department's effort this month has been put on the various products?" He knows if he is a real advertising manager; he knows what his department is working on. For instance, in my own company, the Advertising Department is doing very little at this time of the year with Corn Flakes; the Corn Flakes season

is in decline, being a matter of large sales in summer and not so large in winter. We do not advertise Corn Flakes heavily at this time of the year, but All-Bran is being advertised more extensively than in the summer, because All-Bran is more of a winter product. Therefore, while in the height of the summer season perhaps Corn Flakes might get 60, 70 or 75 per cent of the total of the advertising overhead, at this time of the year it might not get more than 20. Your advertising manager knows. If you distribute it according to the effort he and his department are putting into it, you cannot go far wrong. The same is true of the effort that is put in by your sales executive and his staff. He knows what his department is working on, and therefore he can tell us how that expense should be allocated. I say allocated rather than pro-rated because pro-rating, especially according to sales, is very rarely a fair way to settle the matter. You will find that advertising expense and selling expense usually antedate the resultant sales anywhere from a couple of weeks to a couple of years. You may advertise a product heavily this year and not reap the real benefit until next year or the year after next; and if you wait until sales develop before you charge any expense to a product, you are going to get a distorted analysis of your selling cost.

Then again every organization has a nucleus—a number of key men around whom the whole organization is built. It may be, as in our business, that there are more people employed in the summer than are employed in the winter. If you distribute that expense according to sales, you are going to go wrong on that account, because the selling effort antedates the resultant sales.

I want to repeat now the proposition I mentioned a while back: If you pro-rate your overhead according to sales value, you are not taking into consideration the fact that while some sales are made on merit, other sales are made on the basis of low prices, and you cannot fairly distribute your expense unless you take those elements into consideration.

Let us consider now the distribution of expense by territories or by salesmen. I remember reviewing a book for the National Association of Cost Accountants a year or so ago, written, I believe, by Prof. Hilgert, of the University of Illinois. He went into considerable detail in this book, showing how this expense might

be divided not only by territories but also by salesmen. That is a pretty hard thing to do if you have an organization of any size. It can be done, but it must be determined whether it is worth while or not. If you can get down to the point where you can distribute your selling expense by territories, you can determine which territories are the profitable ones and which are not. Your branch manager or your district manager is not very much on to his job if he cannot tell through the examination of his records which salesmen are delivering the goods in proportion to their cost to him and which salesmen are not. So I would hesitate to recommend to anyone, without knowing the actual conditions, that they attempt to analyze their selling expense by salesmen. It might be an advantageous thing to do, and again it might not be worth the cost.

Now if we analyze the expense of selling by territories, we find it is made up of two elements. In the first place, there is the allocated expense, or expense which emanates from the territories or district offices and which is entirely under the control of the district sales manager. There can be no doubt what that should be charged to, because it emanates from an individual territory and should be charged against that territory. However, we have the general expense of the Sales Department, the general advertising which is not peculiar to any one branch or territory, but which covers all of them. Now Mr. Hilgert in his book developed a very intricate system by which you can build up your profit and loss by territories, but as I said when I was here before, that was before Prof. Hilgert's book came out (and I have not changed my opinion since), it is absolutely unnecessary to distribute the profit and loss by territories. It all goes back to the proposition of standard costs.

You can have standard costs on the selling end just as well as you can on production. If we determine what allowance we are going to make to the branch for selling a unit of your product, and then keep track of the variations from that standard, we are going to know whether that territory is delivering the goods or not. What is the use of building up detailed selling costs by territories any more than building up detailed costs for each of your products in your factory? If you determine what it ought to cost, and then show your variances by classes, to show what they were due to, you will arrive at something that will mean more to you than

merely to distribute the profit and loss by branches. I do not mean that each branch should be allowed the same amount per case for selling products, because some territories have more difficult problems to put their sales across. You get all you would get from a profit and loss statement by territories, and will get more too.

That brings up a little excerpt from a series of articles which a number of you will remember appeared in the *Saturday Evening Post* years ago. I would like to read a little excerpt from one of the "Letters from a Self-Made Merchant to His Son": "In the first place you don't need to bother very much about the things that are going all right, except to try to make them go a little better; but you want to spend your time smelling out the things that are going wrong and persuade them to lead a better life." Now there is the principle of standard costs, the standard cost of selling just as much as the standard cost of production.

And now we come to the question of accounting machinery involved in order to get the figures you want. You probably have your space advertising invoices on file. If you handle these through an agency, they will probably furnish you with a monthly summary showing how much was spent for each product or each type of "ad", so it is a very simple proposition to spread your advertising space expense by products from those invoices. The advertising material, such as these pieces I have shown you, should all be inventoried the same as stock in your factory storeroom, and when they are issued they should be charged out to your branches on something like an inter-house invoice. I would charge the branches, because while some advertising cannot be charged directly to a branch because of the fact that it covers all territories, this kind of "ad" can be charged to the branch because it goes into a definite locality. From the inter-house invoices you can distribute your expense easily if your stock records, invoices and advertising material have listed thereon the standard way of distributing that particular product. For instance, on our stock record for this piece of advertising we will have the invoice number, and the statement that one-half is to go to Corn Flakes and one-half to Pep; and when a shipment is made to a certain branch, a notation is made on the inter-house invoice that it is to be distributed half to Corn Flakes and half to Pep. Samples are handled

the same way. They go into certain territories, and we charge the territory that gets them.

On special trade promotion plans, free goods can be handled from your inventory records, and on the distribution question of the special expenses involved, such as in our case the amount we rebated to retailers covering the cost of Pep, that is easy to distribute by products. We divide the amount of the rebate checks issued in the ratio of 5 to 1; and any other expenses you are put to, your various expense reports, district manager's expense reports, all will give you the detail you need for distributing by products, if you work it out on the basis I laid down in the first part of my talk.

The cost of personal salesmanship and order-taking is gathered from your Sales Department payroll and your expense reports. What Sales Department of any size is there that does not get a report from the salesman as to what he is doing? The same thing is true of dealer helps. The material is charged out as it is issued, both as to territories and as to products, and the expense comes through on your detail reports.

Then it is necessary to have a report from your branch manager of the money he is expending; and he will show you his idea of what products should be charged with the various items of expense; but he will have certain items that he cannot tell what they should be charged to. In our particular forms we have what we call an undistributed column, in which column the branch manager puts the few items which he does not distribute by products. Those items are distributed according to the Sales Department's analysis of the work that is being done in that branch.

Now I know you will say that in an organization that has a very large selling expense, the detail must be tremendous. In our case, we spend pretty nearly $2,000,000 a year in so-called space advertising. We spend pretty nearly $1,000,000 a year in sampling. Our Sales Department overhead is quite large in dollars and cents, because we have a very large volume; and yet the distribution of that expense by products is not burdensome to us, because of the fact that we have used modern methods since long before the War. I would suggest that if any of you gentlemen are contemplating such a problem that you take into consideration tabulating equipment. You cannot tackle any problem

of this sort, where the volume is great, without tabulating equipment, without running into a lot of clerical expense.

Now to sum up what I have covered. In the first place, a very large part of your expense can be distributed absolutely. Just as we found a large part of your advertising is of the one-product type, so right down the line we find a large part of expense can be distributed absolutely. The rest of it has to be analyzed as to purposes involved, and we take into consideration the executive who has in charge the expenditure of the money to find out what he thinks the purpose is. Now I contemplate that in a lot of businesses that may be represented here tonight, there will be items of expense that you cannot find any way to distribute by products without pro-rating; and it may be that there will be a portion of your expense that you will have to pro-rate; but I believe that that will be small in comparison with other expense. It is much better to have 75 per cent of it right, or even 50 per cent right, than to have all of it only on a haphazard or guess basis.

There may be some who will say, "Can't we use some convenient statistical basis? Can't we work up our figures in such a way that we don't have to go through a mass of detail?" All of you who have had experience in factory cost accounting will bear me out that no system of cost accounting either for production or selling, is worth anywhere near its cost if it is not tied in with the general books.

Now we come down to your problem. If you are contemplating starting an analysis or distribution of your selling costs by products, you cannot expect to do it all at once. It has to be a sort of slow evolution; and my advice to you would be to tackle the easiest first and dispose of it and get it working right before you take up the next one. If you start off with the hardest first, you may be discouraged before you get very far; but if you start off with the easy ones and get a record of accomplishment behind you, you will feel more like going ahead with the rest of it. And I want to stress this that I have mentioned before; that no attempt should be made to distribute those expenses without absolute and complete cooperation with your sales and advertising executives, because you won't get anywhere unless you cooperate with them and they know you are trying to do so.

I have told you where to begin and how to begin. Next comes

the question of when to begin. It is an old story—there is no time like the present. If you keep putting it off, you will never get at it.

I was warned by the notice that was sent me that some of you gentlemen were expected to come here prepared to argue, and I believe that I am ready for the discussion. I cannot tell you how I would handle your problem, because I don't know what your problem is, and I would have to study it. Any questions that may be asked I will do my best to answer from the limited knowledge I have of your problem, knowing one has to know what he is talking about before he can do very much talking that is worth while.

DISCUSSION

President Stiles: Gentlemen, we are ready for just as many questions as you can fire at this gentleman in the next few minutes.

Mr. Castenholz: When you apply the standard to the territories, aren't you really getting territorial costs? I might change that—Before setting up branch standards, isn't it necessary to determine the profit and loss status in the territories?

Mr. Barrett: No, it is not. There are some territories that we do not expect to make a profit in. If you know that a particular case of goods, say, sells for $3.00, that you can manufacture it for $2.00, and that you want to make a profit of 50 cents as a minimum, you know the maximum that you can allow that branch for selling that case is 50 cents. It may be that you figure that sales in that territory are easy enough so you ought not allow 50 cents, because you don't want to allow any more than you have to, and you want to keep the profit up as high as you can. But, knowing what your selling price is, knowing what your manufacturing cost is, and the profit you want to determine, you can set the maximum allowance and then temper that as much as your judgment dictates, usually helped along by the record of past experience for each individual branch. When you have done so, you have determined the cost of selling for that branch, to the same extent that you have in the factory when you set the standard cost, and no more. It may be that your costs will run over or under your standard, but still you have such a standard. Those

standards, of course, would be changed from accounting period to accounting period, from year to year, according to the latest experience you might have in any particular territory.

Mr. Castenholz: So you really have a branch standard, and the variation will indicate whether or not the branch is operating according to standard. Now I have one more question. Do you take into your monthly profit and loss statement the actual expenditures of that particular branch, or do you attempt to expense the sales each month on a standard basis?

Mr. Barrett: We take into our accounting system the actual branch expense. That brings up a question which has been discussed very freely especially in the national conventions of our N. A. C. A., as to whether the variances or differences between actual production costs and standard production costs should be thrown into the profit and loss account as additional earning, or vice versa, or carried into a reserve. That, I believe, is a matter that is almost absolutely up to the policy of your financial department, as to what they think best to do, depending upon how they want their financial statement to be used. However, in my own company, we do not set up any reserves for over-or-under-standard, regardless of whether they are on production or on selling. I contemplate, however, that if we were to do it for production, it might be perfectly advisable for us to do it on cost of selling too.

Mr. Wilson: Mr. Barrett kindly invited us to argue with him, but I would rather not argue with a man who knows more than I do. (Once in a while I have a debate with Mr. Castenholz.) I would like to ask for some additional information, though. When the cost accountant finishes his job, whether it is on production or sales, the real, productive end of the thing has only begun. His cost figures, his selling cost figures have got to be tabulated in some way that will make them easily understood by the busy executive and that will inspire him to pat somebody on the back or raise a little constructive hell, according to requirements. I would like, with the consent of you gentlemen, to have Mr. Barrett tell us what is done with these figures, who uses them, and how they are used toward the end of reducing selling costs and increasing selling efficiency?

Mr. Barrett: That is a very apt question, I believe. My answer to it is this: My company is on a budget basis, as I believe every

organization of any size should be. The budget is worked up about this time of year for the ensuing year. The sales manager is allowed a certain number of cents per case for selling each particular product. He in turn breaks that down by branches, to figure out that while he will allow one branch 50 cents for selling that case, another branch he will allow only 30 cents for selling that case; and then in turn that allowance is broken down into the elements of branch expense. For instance, in our particular line, branch expense is broken down into such things as cost of samples, cost of sample distribution, advertising material, display material, dealer helps, and things of that nature; and the Sales Department breaks that total allowance down to get the allowance to that branch for sampling per case of sales actually made. It is contemplated that where sales run over the quota, that usually means additional effort has been expended, and therefore the branch should be allowed more in total, so the allowance is made on the per case basis. Those allowances having been made, and being part of the bonus system by which the branch manager and his salesmen profit, the monthly figures of the cost of samples, say, for the Atlanta branch, would be shown per unit of cases sold. That compared with the actual month to month gives the sales manager an idea how each individual branch is functioning; and the sales report by districts lets him know how he is coming out on his sales. In other words, the thing is very similar to a general budget, only it is worked out through the sales organization, so that each branch is budgeted not only by products, but also by items of expense. At the end of September, as our sales start to decline for the year, the sales manager makes a special check of the nine months' figures, giving him three months to curtail certain endeavors to keep within the allowance. For instance, on sampling; if it is found by the end of September that the sampling cost per case is running high, the sampling will be reduced in that particular territory on that particular product, in order to bring the district manager in line, because the general sales manager himself is only allowed so much per case for selling; and if any of the elements of that, regardless of product, regardless of elements of expense, or regardless of territory, are higher than they should be, it is going to endanger his own standing on a budget comparison at the end of the year. Does that cover it?

Mr. Wilson: Yes. Thank you, Sir.

Mr. Castenholz: Do you budget on the basis of past experience, or do you budget on some element of profit insurance, in the activities of these various branches?

Mr. Barrett: In the first place, there is no profit insurance in our line of business, because we are in a competitive line, and our sales prices are not made according to costs in many instances; they are made according to the market. Therefore we cannot set our budget absolutely to show a certain amount of profit. We do try to learn from the experience of past years, but as the product becomes better distributed, as the product becomes better known, it should cost less to sell it. Where we may allow 36 cents a case for selling this year, that allowance may be cut to 34 or 32 cents next year, because we feel that the time has arrived where that case should be sold for less. Now you know that in various kinds of products there seems to be a limit beyond which those sales cannot be made advantageously. It is not a good thing, from a business standpoint, to push the sales to the point where it costs too much to make them; we would make more profit by selling less goods. So the sales allowance that is budgeted for each year is a combination of three things—past experience, a study of marketing conditions on the product in their proper relation to the ensuing year, and the profit which the management thinks they ought to make per case on that product.

President Stiles: I would like to ask Mr. Barrett a question. You spoke about not carrying any prepaid expenses in your books for distribution. Suppose you had a catalog that cost you half a million dollars to get out. Would you take that amount from profits on manufacturing?

Mr. Barrett: That is a matter of policy. Take our business. We have a good will undoubtedly, created through advertising, that will run into a good many millions of dollars. If the Kellogg Company were for sale, which it never was and I do not think ever will be, it would undoubtedly be bought only when a good many million dollars were added to the tangible assets for good will. That good will has been built up through two things—good goods and advertising. If we advertise and we sample heavily this year, the effect is going to come next year. But the Kellogg Company has always been ultra-conservative in its accounting,

and carries no prepaid expenses of that sort. The only prepaid expenses that we carry over from one year to another that amount to anything at all are our inventory of advertising material; and the reason for that is this: the display material for 1928 was probably printed about August or September, 1927, and we have a large part of it in the advertising stock room or in the hands of the lithographers long before the end of the year. We have to pay for it, but it isn't to be issued until 1928; and so we carry it over in inventory, running maybe $75,000 from one year to the other, but we carry no other prepaid expense. That is merely a matter of accounting policy; and yet if we were to set up a true balance sheet from the standpoint of selling out to new stockholders, we certainly should include in our balance sheet a large amount for advertising that has been done this year.

I remember one thing in particular that came up in connection with our income tax returns. In the year 1918, following out the conservation request from the government, Kellogg's pared their space advertising to the bone. It did not affect 1918, but it did affect 1919. 1919 showed a big slump, showing that advertising expense could probably very properly be charged against the following year and not against the present year.

In the matter of any other company, I should say it would depend entirely upon the financial or accounting policy as to whether they deferred that item of catalog expense, or any other expense that they might have that could in any way be deferred.

President Stiles: I was wondering also whether you required a receipt from these retailers that you gave the $3.00 back to.

Mr. Barrett: They sent in the bill they got from their jobber for the Pep and Corn Flakes which they purchased and we paid them, but we paid only on receipt of that bill. We sent the bill back to them and they have it for their files.

Mr. Himmelblau: Isn't it quite true that in moderate sized establishments, say the establishments where the sales volume is a million or less, such as we poor accountants frequently have to trouble ourselves with, the question of personnel that is going to operate a plan such as may be expected to function intelligently is a real, pressing problem. In other words, the amount of salary that is paid in an organization of that kind to a cost accountant, or sales manager, or the personnel in the Cost Department or in

the Sales Department, is such that it absolutely precludes the building up of a personnel competent to analyze these problems intelligently; and furthermore, that we presuppose a certain portion of the personnel that would not cooperate in the sense that your Kellogg personnel does cooperate. I know of organizations where the factory superintendent has a standing notice to the cost accountant to keep out of his place, and the cost accounting reciprocates. I also know of one organization, of a volume of some $3,000,000, where the cost clerk receives the limited salary of $26.00 a week, his principal duties being to assist in the Sales Department in clerical work, and incidentally in his spare time he is supposed to do some cost work.

The point I am getting at is that in moderate sized establishments, where the sales volume is a million and less, we very rarely have the background; we very rarely have a budget plan in successful operation, and furthermore, you rarely find the backing—executive backing; or, if you find the executive backing, you don't find a personnel competent to carry out the idea. So you have a very serious question of whether it is wise to introduce a detailed analysis, because when you get your figures there will be a great deal of wrangling among departments as to the accuracy of the figures. Furthermore, if the department heads do agree in some sort of compromise, I think the outside accountant without much difficulty could tear those results to pieces, because they have been arrived at in this series of compromises. I think the larger organizations, through superiority of personnel and the use of mechanical equipment are in position to turn out a report that is somewhat accurate, and accurate enough that it can be defended, than the moderate size organizations that comprise the bulk of industries represented in this room. I had the bad fortune last Saturday to hear a poor college professor discuss the cost of distribution at Urbana, and when he got through he had the serious failing of not qualifying his remarks, and the consensus of all the argument was that it was purely theoretical, but absolutely impossible to carry out in practice. But I think it is quite true that in large organizations, where they can use mechanical equipment, so that the information is rather exact, something of value can be obtained.

Just before I came to the meeting tonight I was in a factory

where they are manufacturing caskets. Their product runs all the way from pine box caskets to the metal caskets that only Mr. Stiles or Dean O'Banion, or someone of that nature can purchase. It is a serious question as to how you can distribute the elements of cost such as they have. They have a school where the various undertakers gather together for a week, and they teach them how to promote their business. How would you proportion that cost?

Mr. Barrett: Most large organizations were small once. There are very few successful organizations that start off big and make a go of it. You will find a lot of these organizations have got a lot of capital together to start off, and before they have gone very far they hit a snag. But most of the large organizations today started in a small way. Take, for instance, the well known example of the Ford Motor Company. They started in a small, insignificant manner, and they built up to the size they are today by slow, gradual steps, and finally gained momentum. Now the big organizations today have no more need, or as much, for an analysis of their costs than the small organization, and they have just as much need for an analysis of their cost of selling as of the cost of production. I would suggest that any concern that figures that it is not worth while to get some analysis of the cost of selling, drop also the cost system in the factory.

Take the Kellogg Company. The Kellogg Company was organized in 1906, I believe, with a very limited cash capital. It has been running 21 years. I could take you back to Battle Creek and pull out records that would show you how much it cost per case to sell Corn Flakes in 1906 and 1907. Now it may be the reason why some concerns stay small is because they do not have the information necessary to enable them to control expenditures so they will grow big. If you are losing money on your products, you are not going to grow very fast.

As to how you might work this in an organization where you cannot get the cooperation and support of management, I will say the fault is with the management; not that management intends to be mean and withhold something on you out of spite, but because it does not know any better. If you will examine the record of failures in the United States, you will find that lack of knowledge as to how to do things, which is the basis of efficient management, is one of the big causes of business failures, and

also one of the big causes of small concerns staying small. Now I might say that in a big organization your problems of getting at the cost of selling by products are proportionately greater than in the small organization; and I believe that any ordinary accountant, with a few brains scattered around in his head, could certainly work up a system of figures, tied in with the books, which would give him a sales cost that would be somewhere near right. It might not be more than 50 per cent, but as I said before, 50 per cent right is better than 100 per cent wrong. I would lay the trouble that exists in an organization such as you speak of directly up against the management. I claim the management is not efficient to the extent it is not thoroughly cognizant of what the business is doing if it does not analyze those sales costs.

As to how you would distribute the cost of running that school, I would say to go to the sales manager.

Mr. Himmelblau: There is none.

Mr. Barrett: There must be somebody handling sales, or do those come automatically? Is it a product that sells itself? It may be the general manager who has that as part of his function doesn't know what he is turning out of that school. If he doesn't know what sort of sales it is producing, why does he conduct the school? I would say do away with the cost.

I remember there was a case that came up at one of the conventions of the N. A. C. A. a year ago, I think—a case was cited of how John B. Patterson of the National Cash Register Company was having a conference with his executives, and Hugh Chalmers, who was the chief executive of the National Cash Register Company, made the statement that they had a department in the business that was not serving any value whatsoever, was not giving anybody any information, and that was the cost department; and he challenged the other executives to name a single benefit derived from the cost department. They would not give a single expression of opinion in favor of the cost department, and the cost department was dropped. The result was that another cost department grew up that was delivering the goods and that was telling the executives something, and that cost department is still in existence and nobody is asking for its abolition. Where you find a chief executive of the business, the factory executive or sales executive who is not only not willing but glad to get figures

of the sort I described, he ought to be replaced by someone else.

Mr. Von Arb: I might say a word here about the sad experience we have had by allocating our expenses by products, which was this—that one of the major products that we sell developed into a loss; the more we sold, the more money we lost; and having discovered that, we still are looking for the remedy. There is not an individual concern in the industry that will believe our results, and we have got to meet that competition. We carry that product because we cannot eliminate it; by eliminating it we would eliminate our entire line, and we have the job on our hands of educating the entire field of that competition.

Mr. Barrett: My answer to that is at least you know what you are doing. Before, when you did not have that analysis, you did not know what you were doing. My company is perfectly content to go on and lose anywhere from a quarter to a half million dollars on a product when they feel that that product is good, that it is going to come eventually, but they are not fooling themselves one minute; they know what they are doing; they know what it is going to cost to put that product on the market on a national distribution basis. I claim that if you are losing money on a product, if you must have that product, it is a whole lot better to know you are losing and how much you are losing, than not to know it. And the same thing would hold true of your factory cost. Why keep a factory cost if you eliminate your selling cost? Wouldn't it amount to the same thing?

Mr. Von Arb: It has done this—it has kept the salesman off his usual endeavor along that line; he is not asked to push it.

Mr. Barrett: Isn't that a profitable thing for the business that he should do that? You have to carry the line in order to satisfy the trade, but the less your salesmen push it, the less loss there is going to be.

Mr. Von Arb: That's true.

President Stiles: If I had been looking in the same kind of box Mr. Himmelblau had this afternoon, I would feel the same way as he did.

I just want to leave a little thought with you. I prepared a statement for our management last week, and I showed them that for every dollar's worth of merchandise that we sold to our

different branches we have to have the following expenses before we can see any profit, and I figured the entire movement of merchandise at manufacturing cost rather than at per cent of net sales. It was quite interesting to note the variances at the different branches in direct relation to the manufacturing cost of the merchandise sold. I called attention to the fact that in one case they received $3.03 for a certain product, and in another branch, for the same amount of manufacturing cost they received $3.43. And in some cases it resulted in a very nice, interesting conversation, and I think an argument similar to what Mr. Wilson will have with Mr. Castenholz.

Method of Accounting for Contractors' Equipment

By

WESTON J. HIBBS,

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Philadelphia, Pa.

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

Our present publication is in the field of specialized industries. It deals with one of the interesting phases of large contracting company operations—the accounting in connection with contractors' equipment. The publication is based on a paper presented by Mr. Hibbs at the 1928 Annual Meeting of the Associated General Contractors of America.

The author, Weston J. Hibbs, was graduated from Rugby Academy, Philadelphia, and entered the University of Pennsylvania in the class of 1894, Towne Scientific School. In January, 1892, he left the University of Pennsylvania in the middle of the Sophomore year to accept an appointment as a Cadet in the United States Military Academy at West Point. Owing to his eyesight not being normal he was refused admission and late in the summer of 1892 studied stenography, typewriting, and accounting and in October 1892, he entered the employ of Charles K. Barnes & Company as a junior clerk and salesman with the view of learning the iron and steel industry. From October, 1893, to December, 1897, he was employed by Manning, Maxwell and Moore of 111 Liberty Street, New York City, acting first as a bookkeeper and cost accountant and later as an auditor and systematizer of cost work for factories associated with that organization. He severed his connection with this company in 1897 and immediately entered the employ of the United Gas Improvement Company as Assistant Cashier. In 1912 he was appointed Assistant Comptroller of the company, his work consisting of general accounting work and systematizing records in connecting with the industries in which The United Gas Improvement Company was interested at that time and more particularly those industries in Philadelphia. In 1919 he was elected Treasurer of The U.G.I. Contracting Company, of Philadelphia, Pennsylvania, which position he has held since that date. As Treasurer of the U.G.I. Contracting Company he has charge of accounting procedures as well as being the disbursing officer. Mr. Hibbs is the author of Construction Cost Accounting From the Viewpoint of Both the Contractor and the Customer, published by the National Association of Cost Accountants, April 15, 1924. He is Director of the Philadelphia Chapter of the National Association of Cost Accountants, member of the Depreciation Committee of The Associated General Contractors of America, Incorporated, member of the National Electric Light Association, member of the American Gas Association, and member of The Illuminating Engineering Society.

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AUTHOR'S FOREWORD

THE U. G. I. Contracting Company, of which the writer is Treasurer and in charge of accounting procedures, is a contracting organization associated with The United Gas Improvement Company, which latter Company is an owner of the securities and an advisor of many gas, electric and trolley companies.

An idea of the volume of work done by The U. G. I. Contracting Company may be gathered from the fact that its production during the month of August, 1927, was approximately two and one-half million dollars.

That this production embraces a wide volume of general construction work is indicated by the fact that at that time the Company was building two Dams and two Locks on the Ohio River for the War Department of the United States Government: Piers for a Toll Bridge across the Mississippi River at Cape Girardeau, Missouri, and for a Railroad Bridge across the Ohio River at Cincinnati; a large Dam and Hydro-Electric Plant on the Rocky River near its junction with the Housatonic River; many miles of Transmission Lines in the State of Connecticut and many miles of Gas Mains in the same state; Railroad Car Shops at Wilmington, Delaware, for the Pennsylvania Railroad; erecting three large Factory Buildings at Philadelphia; remodeling a large Office Building in Philadelphia; remodeling and rebuilding many Gas and Electric Light Plants throughout the United States; and manufacturing and shipping certain gas apparatus to foreign countries.

The Company also audits accounts of other companies; has an Appraisal Department which prepares valuation reports of plants for presentation before State Commissions and other regulatory boards, as well as for bond and stock issues.

Approximately 50% of the work is done under some type of cost-plus contract and for companies where the cost must be such as to provide a physical inventory and also be a cost which will stand the most careful scrutiny and investigation as to its soundness both as regards theory and mathematical accuracy.

Much of the construction work of the companies associated with The United Gas Improvement Company is placed with The U. G. I. Contracting Company and a great deal of this work must be done on a cost-plus basis owing to the fact that the art in the

electric industry is such that plants built and rebuilt from time to time are practically never alike. In other words, the art is such that the plant apparatus and method of design is constantly being improved upon.

Therefore it will be seen that the Contracting Company must in its cost accounting system be careful to see that its costs include the true actual cost and only this cost, and that nearly all of its costs must be historical costs.

The system of rentals herein outlined is the result of many years of experience; has been tried and has stood the test as regards its adaptability for estimating purposes and as being a true, fair and sound actual cost.

Also I would like to say that although there are mentioned certain bookkeeping machines in this article, we do not sponsor any particular company's accounting machines. It is true that we have found to our advantage the use of certain machines but the art in bookkeeping machines is advancing so rapidly that perhaps even now there may be on the market better machines than we are using.

Our experience with bookkeeping machines is that they take the drudgery out of routine work and the work is always correct or if there is an error it is so plainly indicated that it will not be passed over. As for the speed in which the work is done, no one can realize it unless he sees the machines in action.

In our business there is required a great deal of detailed cost accounting and it might interest you to know that by changing over our entire cost and ledger accounting system from hand work to machine work we cut the cost of our cost and ledger work by over $100,000 per year. But it took over two years to plan it and put it in operation.

WESTON J. HIBBS.

January 1, 1928.

METHOD OF ACCOUNTING FOR CONTRACTORS' EQUIPMENT

ONE of the large elements of cost in construction work of which it may be said the Contractor can increase or decrease by his skill is the cost of use of equipment.

There are many factors making up a contractor's cost over which he has very little control. As an illustration, consider the cost of concrete work; the Contractor may have very little control over the cost of sand, cement, stone and water. He will, however, have much control over the labor cost and over use of equipment cost.

It may be said roughly that the sometimes termed "bare bone" cost of construction work may be divided generally into the following five major divisions:

1. Cost of Materials.
2. Cost of Labor.
3. Cost of Operation of Equipment.
4. Cost of Use of Equipment.
5. All the various miscellaneous costs not included in the above divisions.

Therefore, apparently it would seem vital that the cost of use of equipment to a contractor be known. However, when we get into actual practice we find it very difficult to get any authentic data on the true cost of use of equipment. By the "true cost" I mean its total cost composed of the purchase cost less salvage value, or in other words, depreciation; repairs; interest on the investment; insurance on the investment; and in addition, what we term "General Expense."

By this latter term "General Expense," is meant such expenses as those incurred while equipment is not in use including the maintenance of a storage yard or storage yards, clerical work keeping equipment records, equipment supervisory work not charged to a particular job, etc.

You will notice that I have made no mention of costs of operation of equipment. We consider this as a separate cost and so do not confuse it with our use of equipment cost or as it is sometimes termed "Rental of Equipment."

Several years ago, when The U. G. I. Contracting Company

was organized, we commenced to study equipment costs and we found it was almost impossible to purchase information upon which to base authentic figures upon which correct rentals may be based and we find the same situation today.

This is something that is very puzzling to the writer; that is, as to why a business as large as the general contracting business has not in general use figures which may be used as truly representing these costs.

This led us to make a study of the question and tabulate our records until today we are in a position to know pretty much just what are our equipment costs.

We have, of course, some equipment of which we do not have sufficient quantity to be certain of the present rentals but every job is bringing us nearer and nearer to the correct figures.

Unfortunately, however, we are placed in a position of having no yard stick to measure whether or not our expenditures are greater than they should be, because apparently we are unable to obtain, either by purchase or from friendly records, similar bona fide figures.

We are able to obtain personal opinions from engineers and accountants but bona fide costs are scarce.

It has been said that over 85% of the firms that enter the contracting business and organize a business large enough to be recorded by financial agencies fail within a few years. It has also been said that nearly all of the failures have been on account of the lack of correct costs.

When we consider the vast amount of business done by large contracting firms; the relatively small percentage of profit upon which large contractors operate; the heavy expenditures which must be made for equipment; and the great lack of knowledge regarding the cost of use of equipment, and its cost of operation, it is not surprising that so many contractors fail.

Also there is another factor in the contracting business that intensifies the importance of the use of equipment cost and that is the great tendency of modern times to decrease the labor hazard and increase the use of equipment hazard by using more and more equipment to reduce labor. It has been stated in an official publication of the Associated Pennsylvania Constructors that in the last fifteen years the percentage of labor to the total cost of certain

forms of contract work has not increased, while the value of equipment is sometimes close to 1,000% in excess of what would have been required fifteen years ago.

(See Page 7 of "Contract Cost Keeping for Highway Construction," published during 1926, by the Associated Pennsylvania Constructors, Pennsylvania, State Branch of The Associated General Contractors of America.)

In order to simplify and ease our accounting work, we have divided our equipment into five classes:

1. MARINE EQUIPMENT
   This class consists of all floating equipment, including such equipment as floating derricks, mixer boats, tug boats, barges, etc.
2. AUTOMOBILE AND TRUCK EQUIPMENT
   This class consists of automobiles and trucks.
3. TRACTOR AND TRAILER EQUIPMENT
   This class consists of tractors and trailers for trucks and tractors.
4. COMPANY EQUIPMENT
   This class consists of all that miscellaneous equipment not included in the above three classes. It includes such equipment as locomotive cranes, locomotives, concrete mixers, pumps, steam shovels, drag-lines, etc.
5. WORK ORDER EQUIPMENT
   This class consists of all equipment purchased only for a specific job or work order and the purchase cost of which is to be charged to that job or work order.

   In this class of equipment may be included, for instance, a valuable piece of equipment purchased for the use of a particular job or a valuable piece of equipment which may be used on a certain job where the work is such as to make the repairs much greater in amount than they normally would be.

So far we have listed what items of cost are involved in the use of equipment, and we will now dismiss this question because apparently there is no discussion on this point.

Our next logical question is the unit of use. Shall it be length of time on the job? Shall it be length of time in actual use? Shall

it be quantity of work performed? Or shall it be a combination of time on the job while idle plus length of time in actual use or plus quantity of work performed?

We have adopted and found very successful the plan of using length of time in actual use for what we term Company Equipment, Tractor and Trailer Equipment, Marine Equipment and also for Trucks. But we use the quantity of work done—that is mileage— as the unit of use for Automobiles. In practically all lines of business I think the mileage unit of use is nearly universal for automobiles and I think justly so. It is particularly so in a business like ours where the mileage is considerable with comparatively little idle time. The unit of actual use for the remaining classes, however, is not so commonly used, so with your permission I will outline our reasons for its use in our business.

First—Its adaptability for estimating. Once having become satisfied as to the period of hours required to do a certain piece of work with a certain piece of equipment, estimating troubles disappear. This result is axiomatic, if this is known and a rental rate is correctly established for a cost per hour.

Second—Ease of ascertaining the basis upon which the rental may be allocated to the work benefited. All we require for this purpose is the time record of the operator. This record if correctly kept should show the work benefited and his idle time awaiting orders.

Third—Elimination of discussions with the customer as to when equipment rentals shall begin and when they shall cease. This is a very important feature when work is done on a cost-plus basis. So much so that some large corporations require these dates indicated in some manner in their contracts.

Fourth—The soundness and fairness of the theory upon which the unit is based. It makes every unit of use pay the same amount for idle time of the equipment, for repairs, for insurance, for interest, and for depreciation.

Fifth—Ease of recording and simplicity of records of equipment performance. This will be demonstrated later in this article when the forms and reports are shown.

There are, of course, a few tools for which we cannot use the

unit of use and these we rent to the job on the basis of the calendar month or days on the job, but there are very few tools so rented.

For instance, we have what we term Standard Equipment Kits. These are large oaken boxes, filled with a number of small tools, such as hammers, chisels, saws, etc. Some of these small tools may be in use more or less all the time and we rent the entire kit on a basis of so much per calendar day. Also there are a few tools such as transits and levels which we rent on much the same basis.

However, as I stated before, there is very little of our equipment so rented.

Small tools, such as shovels, picks, etc., are charged to the job as purchased or shipped from our store yard and credited to the job when returned.

Where the dividing line between small tools and equipment to be rented is not clearly indicated we try to use our judgment by taking into consideration the value of the tool, the necessity for breaking down the rental cost into sub-accounts and the cost of keeping the records.

I know of no serious objection to this unit of use method, although I have heard advanced the question of the tendency of the individual in charge of the work to keep a piece of equipment on the job longer than necessary because he is not charged for equipment while idle. But this, I think, is an administrative question. Personally, I think this is a point in favor of the unit of use because under this plan, once the plan is thoroughly understood and employees appreciate that the Company derives no rental from idle equipment and that the more idle time the greater becomes the rental, they will naturally try to keep down the idle time. I think this system emphasizes idle time and this is certainly desirable. Later you will see in our reports and forms how this idle time question is followed up.

Perhaps you will have noticed that we include the cost of repairs in our rental. This is not general practice. Many contracting organizations of the highest type charge repairs to whatever work the equipment may be doing at the time the repairs are made. I could never see the soundness of this doctrine. It has always seemed to me that every hour of use incurs repairs. In other words, repairs are constantly accruing and therefore the costs

should be so handled. Of course, there is one objection advanced to repairs being included in rentals, namely, when substantiating rentals to customers one must show the cost of repairs and I know of no cost about which apparently so little is known by those who one would think would be most familiar with them than the question as to what is the cost of repairs to equipment.

I have been told by contractors that the method of "sinking" repairs, and by this I mean not showing anywhere in records seen by the customer what is the total cost of repairs, which is accomplished by classifying repairs direct to the work which the equipment may be doing when the repairs are made, is by far the most satisfactory method because it eliminates showing the customer just how great is the cost of repairs.

In the contracting business by the very nature of the work done and the necessity of the portability of equipment, together with its necessary exposure to the elements, repairs are and must be a very heavy expenditure.

Therefore, it seems to me that it is axiomatic that any system which combines these figures and presents them on a basis of showing the individual equipment causing the repairs and showing these figures at regular periods, together with the total to date, should be sound. And you will see from our forms and reports that this is just what we do.

Our next question is that of depreciation, and by depreciation, of course, we mean purchase cost less salvage value, and in addition any improvements which may be made to the equipment. We also class as depreciation a rebuilding cost when it is not a repair. For instance, let us suppose we have a Ford car which has about run out. Its residual value may be $50.00. Our car rebuilder tells us that for $200.00 he can make it nearly as good as new. If we follow his advice we would add the $200.00 to our then depreciated value of the car, which automatically adds $200.00 to our total depreciation. This should not, however, increase our depreciation per unit of use but only increase it in the total amount and defers the time when the total purchase cost is run out.

Now where shall we obtain the depreciation rates? We consult the manufacturers of the equipment, our own engineering force, our own experience, such tables as that of the Associated General Contractors, and any accounting books in which we have faith.

Then with this data before us we make the best guess or estimate we can.

We follow the same practice in estimating repairs as we do regarding depreciation.

Then to these we add our estimate of insurance, interest on our investment and general expenses.

We calculate the interest on the depreciated value of the equipment during its estimated life and not on its purchase cost during this entire period.

We then have our total estimated cost during the life of the equipment, from which we deduct the salvage value, and divide the result by the estimated quantity of units of use to obtain our rental.

In our Automobile and Truck Equipment rental we also include the operating cost. This is due to the constant discussion of what is a repair cost and what is an operating cost. If all repairs to these two classes of equipment such as new tires, etc., are included as repairs, the operating costs are minor and therefore we include them in our rental.

In order that our rentals may be as correct as possible, we are constantly studying our equipment costs and checking up with our estimates. And we do not hesitate to change a rental the minute we have data indicating our estimates are wrong.

We do not, however, change a rental for one piece of equipment if it may indicate that our estimates are in error. We change a rental only when the aggregate costs of all of our equipment of the same type and size indicate that the rental should be changed. And we require that a survey of the physical condition of every piece of equipment be made at least once a year.

Our next question is what unit shall we use for depreciation? For Company Equipment, Tractor and Trailer Equipment and Trucks, we use the unit of use. In other words, we charge up against the equipment depreciation only for the period in use.

Automobiles we depreciate on the basis of unit of work done, that is, per mile.

With Marine Equipment, however, we cannot follow the same practice. Here is a situation where the equipment may depreciate as much and even more when idle than when in use. Also from the nature of our work, which is seasonable, it is necessarily idle a considerable portion of the year. Therefore, we depreciate

this on a monthly basis irrespective of whether or not it is in use. This means that during our working season we must accumulate sufficient rental over and above that required for repair costs accrued to date, to carry the equipment costs until the commencing of work during the following year.

Having now outlined our general procedure and theories upon which they are based, we will take up the methods of recording the costs.

Before going into details it might be wise to call attention to the fact that in our Company we tabulate our costs at the Home Office, keeping in the Field only the unit costs over which the erecting engineer has direct control and which are desirable for him to have daily or weekly.

Also I will have to explain that we have three departments in our Home Office interested in these costs, namely:

1. What we term our Accounting Division. This is a division of the Treasurer's Department wherein are kept the general books of the Company, such as the journals, ledgers, cash books, etc.

2. The Cost Division of the Treasurer's Department. In this division are tabulated and kept the costs of construction work, which costs in total must check with the total of the control accounts in the ledgers kept by the Accounting Division.

3. The Engineering Department. To the Engineering Department are furnished the costs recorded in the Cost Division and included in this Department is the Estimating Division.

For all of our construction work we keep cost books showing the costs in the most minute detail by jobs, each job bearing a serial number, and each job being broken up into sub-accounts, the number of sub-accounts varying according to the size and character of the job. Copies of these cost books are sent to the Engineering Department, to the Estimating Division, and if the work is done on a cost-plus basis, also to the customer to substantiate our expenditures.

We have found that this plan of furnishing the customer carbon copies of our cost books entails less work on our part and is much more satisfactory than is the usual method followed by cost-plus contractors of submitting to the customer copies of all records and a summary of these records.

We use a special type of carbon paper so that at one writing we

are able to prepare as many as twelve copies of our cost books, which is a sufficient number to furnish all those desired by the customer, the Engineering Department and the Treasurer's Department.

Each piece of equipment has a serial number and the number of the equipment is its title and our accounting records are all kept on this basis as in our entire accounting system we use numerical symbols to indicate our accounts and sub-accounts.

With your permission I will now demonstrate the forms and reports used in tabulating these records and will commence with the work in the Field.

The units of use of the equipment are reported daily by the operator for each item of equipment on what we term Operator's Daily Equipment Report Card (see Exhibit 1). This card is composed of five slips and is perforated so that these slips may be readily torn apart. A brief description of the work is inserted by the operator and only one class of work upon which an item of equipment is engaged may be shown on a slip. The operator also inserts on the slip the number of the equipment (which number is plainly marked on every piece of equipment), the units of use, and his initials. These cards are turned in daily when the Field Office dates each slip, inserts the classification, that is, the job number or work order number as we term it, and the sub-account number. If it is not chargeable to a work order number, the symbol for the ledger account benefited is inserted.

The cards are then priced, that is, the rental rates are inserted and the multiplications made.

Each day the Operators' Daily Equipment Report Cards are torn apart into slips and these slips sorted by pieces of equipment and a Daily Equipment Control Sheet is filled out, showing the number of each piece of equipment used, the total rental units, the rate per unit and the total rental amount (see Exhibit 2).

Then a tape is taken off on a bookkeeping machine of the total rental amounts. The slips are then subsorted by work orders and by their sub-accounts and by other accounts as their classification may be.

A bookkeeping machine tape of the totals of the slips is again taken off which is compared with the bookkeeping machine tape before mentioned. This is done to prevent or to indicate errors.

EXHIBIT I

FORM H518A OPERATOR'S DAILY EQUIPMENT REPORT

U. S. I. No. 216 DATE AUG 18 1927

NATURE OF WORK	HRS.	RATE	AMOUNT
Earth Excavation Guide Wall-Lock #51	8	.30	240

CLASSIFICATION 3689

OPERATOR INITIAL J. R. R. 3.11

FORM H518A OPERATOR'S DAILY EQUIPMENT REPORT

U. S. I. No. 216 DATE AUG 18 1927

NATURE OF WORK	HRS.	RATE	AMOUNT
Setting Forms Guide Wall-Lock #51	2	.30	60

CLASSIFICATION 3689

OPERATOR INITIAL J. R. R. 8.16

FORM H518A OPERATOR'S DAILY EQUIPMENT REPORT

U. S. I. No. 216 DATE AUG 18 1927

NATURE OF WORK	HRS.	RATE	AMOUNT
Concrete Work Guide Wall-Lock #51	8	.30	240

CLASSIFICATION 3689

OPERATOR INITIAL J. R. R. 8.37

FORM H518A OPERATOR'S DAILY EQUIPMENT REPORT

U. S. I. No. 216 DATE AUG 18 1927

NATURE OF WORK	HRS.	RATE	AMOUNT
Unloading Piling	4	.30	120

CLASSIFICATION 3689

OPERATOR INITIAL J. R. R. 93-500.5

FORM H518A OPERATOR'S DAILY EQUIPMENT REPORT

U. S. I. No. DATE

NATURE OF WORK	HRS.	RATE	AMOUNT

CLASSIFICATION

OPERATOR INITIAL

The slips are then placed in their proper position together with slips of the previous days not yet recorded on our books.

At the close of each weekly pay period, a bookkeeping machine tape is prepared showing for each piece of equipment a list of units of use and the rental for each day, and the total units of use and the total rental for the entire pay period for each classification, and in addition showing the total units of use and the total rental for the entire pay period for each piece of equipment (see Exhibit 3).

At the same time and in the same operation the bookkeeping machine prepares what we term the Monthly Erection Equipment Report (see Exhibit 4). For simplification of our records we consider a month in the Field to end on the last pay day of the calendar month and therefore the last of these reports made during the fiscal month in the Field becomes the Monthly Erection Equipment Report for that month. You will note that this report is a summation of the figures on the bookkeeping machine tape, Exhibit 3, plus the units of use and hours accumulated during the previous days of the fiscal month in the Field.

You will see that the first column of this report shows the work order number or account number, as the case may be. The second column shows the sub-account number. The third and fourth columns show the total units of use for each piece of equipment for each classification and the total rental for each classification for the current period. The fifth and sixth columns show the total units of use to and including the preceding weeks of the period for each classification up to the days covered by the current week. The seventh and eighth columns show the total units of use for each classification and the total rental for each classification for the entire period covered by the report for each piece of equipment.

Then below is shown the total units of use for all classifications and the total rental to date for all classifications.

A bookkeeping machine tape is then prepared of the total units of use and the total rentals for each work order number or account number which is written by the machine under the heading "Posting Summary."

Bookkeeping machine tapes are then taken of the totals of the Daily Equipment Control Sheets, Exhibit 2, and the totals of the Monthly Erection Equipment Reports, Exhibit 4, to prove the

THE U. G. I. CONTRACTING COMPANY

DAILY EQUIPMENT CONTROL SHEET

Thursday August 15th 1947

DAY OF WEEK — DATE

Dock # 51 Golconda, Ill.

LOCATION

NAME, NUMBER OR DAY	DATE		TOTAL RENTAL HRS.	RATE PER RENTAL UNIT	TOTAL RENTAL AMOUNT
47			3	13	39
91			8	75	600
98			7½	300	2205
127			2	20	40
144			8	15	120
165			7½	30	225
180			8	50	400
185			2	45	90
189			11	85	935
216			22	30	660
220			14	30	420
228			4	275	1100
229			5	165	825
232			2	125	250
233			8	125	1000
234			16	260	4160
239			6½	550	3575
244			8	43	344
248			24	43	1032
251			5	40	200
254			16	45	720
300			1	75	75
321			8	95	760
521			11	90	990
523			2½	90	225
524			9	90	810
535			2½	50	125
596			1	35	35
600			10½	50	525
601			3	40	120
605			10	17	170
723			6	24	144
6203			20	625	12500
6206			2½	875	2188
6208			6	165	990
6223			13	485	6305
6266			5	35	175
6791			17	535	9095
TOTAL			3152		$ 54897

SIZE OF THIS FORM 4" x 5½"

EXHIBIT 2

EXHIBIT 4

The U. S. I. Contracting Company

MONTHLY ERECTION EQUIPMENT REPORT

ACCOUNT TO CREDIT (CLASS OF EQUIPMENT)

NAME OF EQUIPMENT AND NUMBER: Dake Swinging Engine #216

LOCATION: Golconda, Ill.

RATE: 30¢ per hour

FOR PERIOD ENDING: Aug. 31, 1927.

Accounts Chargeable: W. O. or Acct. No.	Accounts Chargeable: Sub Acct. No.	Do Not Post — Current Charge: Hours	Do Not Post — Current Charge: Amount	Do Not Post — Previous Charge: Hours	Do Not Post — Previous Charge: Amount	Amounts Chargeable: Hours	Amounts Chargeable: Amount
WO 3669	1 61			16	480	16	480
	3 11	16	480	92½	2775	108½	3255
	8 15			8	240	8	240
	8 16	2	60	34	1020	36	1080
	8 17			8	240	8	240
	8 18			29½	885	29½	885
	8 37	15	450	175½	5265	190½	5715
	93 313			16	480	16	480
	901	6	180			6	180
	1301			1	30	1	30
	5004	14	420	15	450	29	870
	5005	20	600	8½	255	28½	855
	51 12			9	270	9	270
	58 15			2	60	2	60
WO 4446	93 3						
	901	8	240			8	240
	5004	48	1440			48	1440
WO 5099	100			2	60	2	60
WO 6138	100			2	60	2	60
						548	16440
		Posting Summary					
WO 3669	93					488	14640
WO 4446	93					56	1680
WO 5099	93					2	60
WO 6138	93					2	60
						548	16440

Prepared By: G. W. P.

Checked By: T. F. L.

Approved By: H. G. M. [illegible]

Size of this Form $9\frac{1}{2}" \times 11\frac{1}{2}"$

[illegible] ______

EXHIBIT 3

[illegible]

C. E. No. 216

[illegible] WO 3669	3 11			
AUG 18			8	240
19			8	240
			16	480
WO 3669	8 16			
AUG 18			2	60
			2	60
WO 3669	8 37			
AUG 18			8	240
19			7	210
			15	450
WO 3669	93 901			
AUG 18			6	180
			6	180
				0
WO 3669	93 5004			
AUG 20			2	60
21			4	120
22			8	240
			14	420
WO 3669	93 5005			
AUG 18			4	120
20			4	120
21			12	360
			20	600
WO 4446	93 3 901			
AUG 20			8	240
			8	240
WO 4446	93 3 5004			
AUG 20			2	60
29			24	720
30			22	660
			48	1440

Size of this tape $4\frac{1}{2}"$ wide

accuracy of the record, as the aggregate of these totals should agree.

At the end of the fiscal month in the Field a copy of this Monthly Erection Equipment Report is sent to the Home Office for entering in their records and a new accumulation of this data is commenced in the Field.

From this description the work looks very laborious but in actual practice this is not the case. The work is done very rapidly on a specially designed Burroughs Bookkeeping Machine. This machine was designed primarily for distributing our payrolls in the Field but it was found that it could be used for this work as well as for the payroll work. It is electrically operated, is both a multiplying and adding machine and one cannot realize the speed and accuracy by which these figures are created and tabulated by this machine, unless by seeing it in use.

In the description given you I have shown the method followed in our larger jobs, and by this I mean a job where we have in the Field at least 125 men.

On our smaller jobs where no unit costs are kept in the Field and which would not warrant the use of bookkeeping machine for payroll work and also would not warrant the use of a machine simply for the recording of equipment records, we follow the same principle as regards the Operator's Daily Equipment Report Cards, tearing the slips apart and sorting them, but we prepare the reports for the Home Office by hand on a special form of Monthly Erection Equipment Report (see Exhibit 5). You will note in this case the report is very similar to an ordinary time voucher with the exception that the month is shown from the 26th day of one month to the 25th day of the following month.

On small jobs we consider an equipment month in the Field as being from the 26th to the 25th in order to give those in the Field sufficient time to get the report into the Home Office. These reports are made for each piece of equipment and show the nature of work done, the units of use, the dates on which the work is done, and the work order or account number to which the work should be charged.

When repairs are to be made either in the Field or at the storage yard, and it is estimated that the repair job will cost less than $50.00, the repairs are classified to an account entitled "Company

EXHIBIT 5

1 Copy for Treasurer
1 " " Records Division
1 " " Field File

Account to Credit (Class of Equipment)

Rate Total Amount

The U. G. I. Contracting Company

MONTHLY ERECTION EQUIPMENT REPORT

Name of Equipment and Number 10 cu ft Ransome Mixer #1735
Location 6th & Duncannon Ave, Philada. Pa
For Period ending July 25th 1927
Approximate Date of Release

Fill out in accordance with instructions in Handbook relative to Erection Equipment.

NATURE OF WORK	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Total Days in Use	ACCOUNTS TO CHARGE: Work Order Number or Ledger Account	Equipment W. O. Expenses G. & A.	W. O. Sub Accounts Installed	Amounts
Pouring Concrete Fittings							2	2	SUNDAY	H'd	4	9	9½	4	1½	SUNDAY	1	4		2	2		SUNDAY			7				SUNDAY		49	5702	93	222	
" " Mandrels		Received 7/11/27																		4						4						12	"	"	"	
" " Wall																					4½			4½	3						3	17	"	"	"	
" " Garage Fittings																								4½								4½	"	"	622	
							2	2	5	H'd	4	9	9½	4	1½	5	1	4		8	4½		5	4½	4½	5	3			5	3	82½				

Note: This report must be mailed not later than the 30th of the month.

Prepared by W. R. W.
Checked by J. A.
Date 7/26/27

(S) E. C. Raymond
Erecting Engineer

Size of this form 7½" x 15½"

Equipment Expense and Repairs," followed by the number of the equipment and the number "1."

If, on the other hand, it is estimated that the cost of the repair job will exceed $50.00 a repair job number is assigned to it and the classification is "Company Equipment Expense and Repairs," followed by the equipment number and the repair job number.

Upon the commencing of work at a location a new series of repair job numbers is opened for that location which continues until all the work at that location is completed. As these repair jobs are opened the Field advises the Home Office, giving the estimated cost of the repair job and a description of the repairs to be made (see Exhibit 6).

Each month the Home Office sends to the Field for each piece of equipment the details of the cost of repairs (see Exhibit 7); the cost of operating expenses (see Exhibit 8); the amount of rentals and the cost of freight and cartage (see Exhibit 9); and the cost of erection and removal (see Exhibit 10). The data on these reports as illustrated by Exhibits 7, 8, 9, and 10 are posted on cards by the Field Force (see Exhibit 11).

You will note that the reports illustrated by Exhibits 7, 8, 9, and 10 are in detail while Exhibit 11 shows only monthly totals.

The reports illustrated by Exhibits 7, 8, 9, and 10 are carbon copies of the cost sheets of the Home Office and are sent to the Field for the information of the engineer in charge of the job so that he may see exactly what builds up these costs.

We will next take up the recording work done in the Cost Division.

When equipment is purchased the Cost Division is notified by the Accounting Division of its serial number and its description, together with the rental rate.

A card is then opened for the equipment (see Exhibit 12).

You will note that on this card provision is made for the insertion of the locality where the equipment is used; the cost of freight and cartage divided into material and labor; the cost of erection and removal divided into material and labor; the major job or account numbers benefited by the work of the equipment; the cost of operating expenses; the units of use; the rental rate; the operating cost per unit of use; and in addition a column for the purchase cost per unit of use.

EXHIBIT 6

THE U. G. I. CONTRACTING COMPANY

EQUIPMENT REPAIR REPORT

Copy to: Field Supervising Engineer
Cost Division
Accounting Division
Stenographic Division
Erecting Engineer
Field Auditors' File

Location New Milford, Conn.

Date October 3, 1927

Weston J. Hibbs, Treasurer
The U. G. I. Contracting Company
Room 711 Fidelity Building
112 North Broad Street
Philadelphia, Pa.

Dear Sir:

Subject: Equipment Repair Job No. 189

Repairs to #18 - 3/4 Yd. Osgood Caterpillar Steam Shovel Equipment No. 236 have been started at this location. The estimated cost of this repair job is $ 300.00

GIVE BELOW BRIEF DESCRIPTION OF REPAIRS:

Two driving tumbler shafts, one hoist drum shaft and one "I" beam for revolving frame.

Yours very truly,

F. L. Blee (Signed)

Field Auditor.

SIZE OF THIS FORM 8½" x 11"

EXHIBIT 7

	Work Order No.			Description	
				#240 - No. 802 3½ Yd. "Bucyrus" Electric Driven Dragline.	New Milford, Conn.
	Sub-Account No. Job #35				
			Month of	February, 1927.	
	Date of Bill	Purchase Order No.	Serial Number	Description	Total
				Amount Forward	
				MAKING HOIST SHAFT	
	2-19-27	TDR #84	130631-A	Payroll week ending February 16, 1927, 10 Hours,	10.30
	2-26-27	TDR #86	130667-A	Payroll week ending Feb. 23, 1927 - 60 hrs.	56.85
	2-6-27	Req.#1560	132947-A	7' Brake Lining 2.098 14.69 4 Bucket teeth 11.41 45.64	60.33
	2-28-27	Journal Entry	133139-A	Rental of #615 - 28" "Rockford" Shaper, for month of Feb. 1927 - 15 hours -	5.25
	"	"	"	Rental of #614, - No. 10 "Racine" Belt Driven Metal Saw, for month of Feb. 1927 - 2 Hours -	.80
	"	"	"	Rental of #617 - 24½" x 14' "LeBlond" Belt Drive Engine Lathe, for month of Feb. 1927- 18 Hours -	18.00
	"	"	"	Rental of #616 - 24" "Aurora" Belt Drive Upright Drill Press, for month of Feb.1927- 9 Hours -	2.25
	"	"	133136-A	Rental of #7174 - 1 Ton Ford Truck for month of February, 1927 - 7 Hours -	7.70
					161.48
				Size of this form 10½" x 11"	
				Carried Forward	

EXHIBIT 8

WORK ORDER NO. 3818 — **DESCRIPTION** Erection Equipment Operating Expenses

SUB-ACCOUNT NO. 93.1

Jaeger Mixer #95 — **MONTH OF** October, 1925

ESTIMATED COST
MATERIAL Part of Erection Equipment
LABOR Operating Expenses
FREIGHT & CARTAGE
TOTAL Jaeger Mixer #95

WORK ORDER NO. 3818
SUB-ACCOUNT NO. 93.1
SHEET NO. 1

Date of Bill	Purchase Order No.	Serial Number	Description		Brought Forward	Total	Material	Labor	Freight and Cartage	From Whom Purchased
9-28-25	Req.113	54048-A	2# Alemite Grease	.182	.37					
			1 Gal. Engine Oil	.32	.32					
			10 " Gasoline	.17	1.70	2.39	2.39			N.B.S.R.S.
9-28-25	Req. 79	54048-A	5 Gal. Gasoline	.17	.85					
			1 " Engine Oil	.32	.32					
			3# Albany Grease	.077	.23					
			2 Gals. Gasoline	.17	.34					
			1 Gal. Kerosene	.12	.12					
			2 Gal. Cylinder Oil	.355	.71					
			5 " Gasoline	.17	.85	3.42	3.42			N.B.S.R.S.
10-1-25	Req.154	"	5# Waste	.08		.40	.40			"
10-4-25	" 172	"	13 Gals. Gasoline	.17	2.21					
			10# Alemite	.185	1.85					
			1 Gal. Engine Oil	.32	.32	4.38	4.38			"
10-7-25	FDR #38	55286-A	Payroll week ending 10-7-25 7 hours			2.98		2.98		
10-7-25	Req-197	54048-A	2- Gals. Cylinder	.35	.70					
			5- Gals. Gasoline	.17	.85	1.55	1.55			N.B.S.R.S.
10-14-25	FDR #41	55326-A	Payroll week ending 10-14-25 18 hours			5.66		5.66		
10-19-25	Req. 376	54048-A	5 gal. gasoline	.17		.85	.85			"
10-4-25	" 299	"	10 gal. gasoline	.17		1.70	1.70			"
10-21-25	FDR #44	59508-A	Payroll Week ending 10-21-25 1 hour			.23		.23		
10-28-25	FDR #47	59555-A	Payroll Week Ending 10-28-25 2 hours "			.50		.50		
						24.06	14.69	9.37		

Size of this Form $10\frac{1}{2}" \times 17"$

EXHIBIT 9

WORK ORDER NO. 3818

DESCRIPTION: Erection Equipment Purchase Cost or Rental

SUB-ACCOUNT NO. 93.

Jaeger Mixer #95

MONTH OF October, 1925

ESTIMATED COST

MATERIAL Part of $32,351.00 for

LABOR Erection Equipment

FREIGHT & CARTAGE

TOTAL Jaeger Mixer #95

WORK ORDER NO. 3818

SUB-ACCOUNT NO. 93.

SHEET NO. 1

DATE OF BILL	PURCHASE ORDER NO.	VOUCHER NUMBER	DESCRIPTION	TOTAL	MATERIAL	LABOR	FREIGHT AND CARTAGE	FROM WHOM PURCHASED
			BROUGHT FORWARD					
10-31-25	Journal Entry	57975-A	Rental of Jaeger Mixer UGI #95 for the month of October, 1925 - 80¢ hours	48.30	48.30			
"	"	58264-A	Freight bill #1294 of The International Great Northern R.R. Co., covering shipment of the following material from The U.G.I. Cont. Co., Sioux City, Ia., in car C.M. Stp 1 C/I Contractors Equipment Weight 43800# $600.06 Properties to this Equipment	95.45			95.45	
				143.75	48.30		95.45	

Size of this form 10½ x 17

WORK ORDER NO. 3818

DESCRIPTION: Erection Equipment Erection & Removal

SUB-ACCOUNT NO. 93-3

Jaeger Mixer #95

MONTH OF September, 1925

ESTIMATED COST
MATERIAL Part of 14,600.00 for
LABOR Erection Equipment Erection
FREIGHT & CARTAGE & Removal
TOTAL Jaeger Mixer #95

WORK ORDER NO. 3818
SUB-ACCOUNT NO. 93-3
SHEET NO. 1

DATE OF BILL	PURCHASE ORDER NO.	SERIAL NUMBER	DESCRIPTION	TOTAL	MATERIAL	LABOR	FREIGHT AND CARTAGE	FROM WHOM PURCHASED
			BROUGHT FORWARD					
9-2-25	PDR #27 PO-69682	52353-A	8 3/8" x 1¼" Machine Bolts with Hexagon nuts @ .04	.32	.32			Louis Menne Co.
9-16-25	PDR #29	52372-A	Payroll week ending 9/16/25 - 2 hours	.68		.68		
9-23-25	PDR #32	52403-A	Payroll week ending 9/23/25 - 2 hours	1.15		1.15		
				2.15	.32	1.83		

Size of this form 10½" x 17"

EXHIBIT IO

CARD NUMBER 1 Company — ERECTION EQUIPMENT RECORD — COMPANY NUMBER 1641

DESCRIPTION #105 "Northwestern" Gas Driven Caterpillar Crane (see remarks)

AUTHORITY FOR PURCHASE Approval of Mr. W.L. Chewning, Vice-President, on memorandum of Mr. F.S. Harvey to Mr. W.L. Chewning, dated 10-5-26

AUTHORITY FOR ADDITIONS AND BETTERMENTS

						Per Hr. Operation	Per Hr. Lost Time
CAPACITY 1/4 yd.	PURCHASE COST INCLUDING OF FREIGHT	$ 10,779.80					
SHIPPING WEIGHT	FREIGHT	$		10779.80	10779.80		2.25
ESTIMATED LIFE (OR LIMIT) 96 months 16000 hrs.	ESTIMATED REPAIRS DURING LIFE	$ 4,300.00	ESTIMATED SALVAGE VALUE	$ 500.00			2.10

Month 1927	Location	Name of Erecting Engineer	Repairs	Operating Expenses (Fuel, Oil, Etc.) Material	Labor	Total	Hours	Operating Expense Rate per Hour	
JAN	TAMPA, FLA.	R.L. FAITHORN	1 73	9.66	3 82	13 48	42	.32	
FEB	CAPE GIRARDEAU,MO.	R.G. STOWELL	3 00	55.10		55 10	101	.54	
MAR	CAPE GIRARDEAU,MO.	R.G. STOWELL	459 71	166.75		166 75	182	.91	NEW RATE
APR	CAPE GIRARDEAU,MO.	R.G. STOWELL	7 61	46.48		46 48	82	.57	
MAY	CAPE GIRARDEAU,MO.	R.G. STOWELL	15 97	22.86		22 86	42	.54	
JUN	CAPE GIRARDEAU,MO.	R.G. STOWELL	19 07	28.13	5 00	33 13	24	1.39	
JUL	CAPE GIRARDEAU,MO.	R.G. STOWELL	9 23	9.53	2 00	11 53	42	.27	
AUG	CAPE GIRARDEAU,MO.	R.G. STOWELL	7 84	84.41	6 90	91 31	232	.40	

Additional Expenses Per Work Order — Freight and Cartage: Material	Freight and Cartage: Labor	Erection and Removal: Material	Erection and Removal: Labor	Month 1927
	27 98			JAN
805.14	51 95			FEB
		19 13		MAR
				APR
				MAY
				JUN
				JUL
		21 33	18 34	AUG

MANUFACTURER Northwest Engineering Co. Chicago, Ill. PURCHASED FROM Northwest Engineering Co. Chicago, Ill.

PURCHASE DATE 7-1-26 ORDER NUMBER E-10225 SERIAL NUMBER 117741-A NEW OR 2ND HAND New MFGRS. NUMBER 1179 DATE BUILT

SPECIFICATIONS ON MOTOR OR ENGINE BUILT TYPE 6½ x 8" Twin City ENGINE NUMBER HORSE POWER 60 VOLTAGE CYCLE 650 R.P.M.

CYLINDERS Four DIAMETER OF BORE 6-1/4" STROKE 8" MOTIVE POWER Gasoline

REMARKS: 40' lattice type boom, 20" tread, 12'10" crawlers, 3 sided steel cab, Twin City Engine equipped with Steward Vacuum Gasoline Feed and Bosch High Tension Magneto Ignition, tagline equipment for clamshell operation, including tools, cable, etc.

SIZE OF THIS FORM 10"x 11"

EXHIBIT II

DESCRIPTION 1 Rex Jaeger Gasoline Driven Concrete Mixer EQUIPMENT NUMBER 22

EXHIBIT 12

equipped with Steward Vacuum Gasoline Feed and Bosch High Tension Magneto Ignition, tagline equipment for clamshell operation, including tools, cables, etc.

SIZE OF THIS FORM 10"x 11"

1 Bag Jaeger Gasoline Driven Concrete Mixer — EQUIPMENT NUMBER 92

ADDITIONAL EXPENSES PER WORK ORDER: FREIGHT AND CARTAGE MATERIAL	FREIGHT AND CARTAGE LABOR	ERECTION AND REMOVAL MATERIAL	ERECTION AND REMOVAL LABOR	WORK O.O.	LOCATION	ERECTING ENGINEER	OPERATING EXPENSES (POWER, OIL, ETC.) MATERIAL	LABOR	TOTAL	HOURS	OPERATING EXPENSE PER HOUR	PURCHASE COST PER HOUR	RENTAL PER HOUR	
					Fr.Sioux City, Ia.	8-1-25								
				3818	N.Braunfels,Tex.	H.J. Heard								
					To Storeroom 9-20-26									
218.35	7.76	4.99	41.44	3818	N.Braunfels,Tex.	H.J. Heard	129.99	94.62	224.61	788	.2847		.60	
					Fr. N.M. 10-30-26									
				4582	B. & Arch. Phila.	L.E.Maynard								
					To Norristown 4-12-27									
24.50				4582	B. & Arch. Phila.	L.E.Maynard	21.08		21.08	96	.219		.75	D 4-18-27
					To Chester 5-16-27									
12.50		2.02	40.42	5683	Norristown,Pa.	A.B.Fryer	18.06		18.06	72	.251			
				6023	Chester,Pa.	L.B. Moxon								

SIZE OF THIS FORM 11"x14" #

This last mentioned column is used where a piece of equipment is purchased and charged direct to the job, and where all of its costs or some specific portion of its cost, as the case may be, are to be considered as a rental rate.

The question might be asked as to why we have two columns for what might be termed the rental rate because, after all, if a job is charged with the entire cost of the equipment then the rental rate is this cost divided by the units of use. Our object in doing this is to distinguish very carefully between a purchase cost rental rate and a true rental rate. The purchase cost rental rate, of course, is not an equitable rental rate unless it so happens that the life of the equipment is entirely run out during the job, which rarely happens.

This card is a little complicated at first but with some explanation can be readily interpreted. Each line represents one year. The check marks indicate months in which the equipment was used on the job and the circles indicate months when the equipment was on the job but was not used. These checks and circles are entered monthly from the Monthly Erection Equipment Reports as fast as they are received from the Field. From this record we follow up our Equipment in the Field as regards its being in use.

You will note that the card in question shows that the equipment was transferred from Sioux City, Iowa, to New Braunfels, Texas, on August 1, 1925, where the Engineer in Charge was H. J. Hoard. The record shows that the equipment was not used during August but was used during September, October, November and December of 1925, and in January, February, March, April, May, June, July, August and September of 1926. On September 20, 1926, the equipment was shipped to our storeroom. On October 30, 1926, the equipment was shipped from our storeroom at Norristown to Broad and Arch Streets, Philadelphia, for use on a job under the control of Engineer in Charge L. E. Raymond. At this last location the equipment was not used during the month of November, but was used during December and January; idle in February, and again used in March and April, and it was returned to the Norristown Storeroom on April 12, 1927.

The cost figures are not entered on these cards except upon the completion of the work at each location. For instance, you will note on the fourth line from the top are the first cost entries, com-

mencing on the left side of the card with the figure $218.35 for freight and cartage. Under each heading are the costs for the entire period that the equipment was at New Braunfels, Texas.

Correspondingly, line eight commencing with $24.50 for freight and cartage shows the costs at the Broad and Arch Streets, Philadelphia, work.

You will readily see from this card that the Cost Division is in a position to almost immediately give the Estimating Division or any of the engineers who desire it, the operating expenses divided into material and labor; erection and removal and freight and cartage costs divided into material and labor; units in use; operating costs per unit of use; and the rental rate per unit of use.

These cards are filed according to equipment number and a cross index is maintained so that a card may be located almost immediately.

The cost figures shown on these cards are posted direct from the total costs as shown in our typewritten cost books as for all jobs of any size we open in the cost books sub-accounts for each piece of equipment, for the operating cost, for the rentals and freight and cartage, and for the erection and removal costs.

You will notice on this particular card that the operating expense at New Braunfels, Texas, was 28.47 cents per hour, while at Broad and Arch Streets the operating expense was 21.9 cents per hour, and at Norristown 25.1 cents per hour.

Of course our purchasing advantages at some locations are greater than in others which may have a tendency to cause a variance in the operating costs.

When we talk about operating expenses we do not include erection and removal, and freight and cartage, because for obvious reasons these expenses may vary very materially.

The wisdom of not including the erection and removal and freight and cartage costs in operating expenses is clearly illustrated on the card shown as Exhibit 12.

At the commencing of the work at New Braunfels, Texas, the nearest location from which we could ship this equipment to New Braunfels was Sioux City, Iowa, and it stands to reason that the freight from Sioux City to New Braunfels, Texas, and back to our Norristown store yard must be considerably greater than the

freight from Norristown, Pa., to Broad and Arch Streets, Philadelphia, and return.

Also the erection and removal costs may fluctuate violently with jobs according to whether the piece of equipment remains stationary or is relocated from time to time while on the site of the work.

A natural question is, "Why do we break up these expenses so much?" The answer is we have learned that if we do not break them up it is useless to try to compare costs per unit of use or to place our engineers in a position to do anything towards studying these costs, without which nothing can be looked for in the nature of a reduction in these costs. Also with using Hollerith machines or any other good bookkeeping machines, it is cheaper to break up accounts than to analyze them after the work is done.

In the Cost Division we use the Hollerith tabulating machines for tabulating our expenditures for our cost books and for our control accounts kept in the general ledgers, by the Accounting Division.

You will notice in our system the Cost Division builds up the costs for the Accounting Division, while in many systems the Accounting Division breaks down the costs for the Cost Division. Our principle is that the cost figures should be prepared with the utmost speed and when they are prepared they should be correct so that they may be distributed as rapidly as possible. We use machine work entirely so that when our costs are completed we know that they are correct and that the totals given to the Accounting Division for the control accounts in the general ledgers will agree with our total costs.

As I do not think it is entirely relative to the subject we are discussing, I will not explain the Hollerith tabulating machines except to say for the benefit of those who are not familiar with these machines that a card is punched for every item of expenditure after which the cards are electrically sorted and tabulated following which the items are immediately typewritten in the cost books and then permanently filed.

The Cost Division after tabulating expenditures advises the Accounting Division of the total expenditures both in the Home Office and the Field, divided into the work orders and the general ledger accounts.

In other words, all expenditures made by the Company pass

through the Cost Division with the exception of some few expenditures which are not relative to construction costs, and which may be entered in the ledgers direct from the cash books or journals. These items, however, are comparatively few in relation to the number of items of expenditures.

Upon the completion of a job the sub-accounts for use of equipment or rentals, which include freight and cartage, sub-accounts for the operating expenses of equipment, and sub-accounts for the erection and removal expenses of equipment, can be closed by credits and transferred to the sub-accounts for the work benefited by the use of the equipment, the basis of the distribution being the units of use. Anyone familiar with the Hollerith tabulating machines will know the ease and rapidity with which these distributions can be made.

We will next take up the work of the Accounting Division.

As equipment is purchased an Equipment Card is prepared (see Exhibit 13). This card is used to record by months all the data regarding the equipment during its life.

The Accounting Division then endeavors to obtain from our engineers, from the manufacturers of the equipment, from tables or writings in which we may have confidence, and finally from our own previous experience according to our records, the following information:

Estimated life in hours.
Estimated life in months.
Estimated repairs during life.
Estimated salvage value.

Exhibit 14 shows the form used in requesting this information from our engineers. We do not use any particular form for requesting information from the manufacturers as this is usually done by letter or sometimes verbally.

After securing all of this information the Accounting Division then estimates the interest, insurance and general expenses of the equipment during its life. The total of all these costs is then combined and divided by the estimated units of use, which gives us the estimated rental rate.

Sometimes there is delay in obtaining some of this information and if the delay is considerable a temporary rental rate is used until the information is secured and a permanent rate established.

If the equipment when purchased is delivered direct to a job, the Accounting Division forwards the Erection Equipment Record Card (see Exhibit 11) to the Field, on which has been inserted the following information:

Description of the equipment.
From whom purchased.
Equipment number.
Order number.
Serial number.
Purchase date and purchase cost.
Estimated life in units.
Estimated repairs during its life.
Estimated scrap value.
Rental rate.

This is a carbon copy of the Equipment Record Card (see Exhibit 13) insofar as the description of the equipment is concerned. Then if there are any changes made in any of this information, such as a change in the rental rate, or a change in the purchase cost caused by some betterment, this information is sent to the Field where it is entered on the card. This card follows the equipment from location to location.

The Monthly Erection Equipment Reports (see Exhibits 4 and 5) are forwarded by the Cost Division to the Accounting Division from which are obtained the monthly entries for Equipment Record Card (see Exhibit 13) of the location of equipment, name of engineer in charge, units of use and rental. In order to facilitate posting this card, a summary is first prepared by equipment numbers of the figures to be posted (see Exhibit 15).

In the meantime the Cost Division has forwarded to the Accounting Division a summation of the repairs according to equipment numbers, which has been prepared on the Hollerith machines from the Repair Cost Books. These repair costs are then entered on this summary after which the depreciation is calculated and entered on the summary, and in addition each third month the interest, insurance and general expense costs are also entered. These last three items are comparatively small in amounts and therefore are entered on the cards but once every three months.

You will notice that the last column is headed "Purchase Cost." This means improvements or betterments which may be made.

EXHIBIT 13

CARD NUMBER 1 — COMPANY EQUIPMENT RECORD — COMPANY NUMBER 1641

DESCRIPTION #108 "Northwestern" Gas Driven Caterpillar Crane (see Remarks)

AUTHORITY FOR PURCHASE Approval of Mr. W. L. Chewing, V. P. on memo of Mr. F. E. Harvey to Mr. W. L. Chewing dated 10/5/26

AUTHORITY FOR ADDITIONS AND BETTERMENTS

CAPACITY 1/4 yd. — PURCHASE PRICE 10,599.80

SHIPPING WEIGHT — FREIGHT $

ESTIMATED LIFE: YEARS 96 mos. 16000 hours — ESTIMATED SALVAGE VALUE $4,300 — ESTIMATE SCRAP VALUE $400.00

RENTAL RECEIVED			NUMBER OF UNITS			ACCOUNT OF RENTAL			
Month	LOCATION	NAME OF OPERATING SUPERVISOR	CURRENT MONTH	PICK UP	TOTAL TO DATE	CURRENT MONTH	PICK UP	TOTAL TO DATE	REMARKS
JAN 1927	TAMPA, FLA	R. L. FAITHORN	42	1182	1224	94.50	2660.64	2755.14	
FEB	CAPE GIRARDEAU	R. G. STOWELL	101	-1224	1325	228.38	2755.14	2983.52	NEW RATE
APR	CAPE GIRARDEAU	R. G. STOWELL	244	1325	1569	554.40	2983.52	3537.92	
MAY	CAPE GIRARDEAU	R. G. STOWELL	42	1589	1631	88.20	3537.92	3626.12	
JUN	CAPE GIRARDEAU	R. G. STOWELL	24	1631	1655	50.40	3626.12	3676.52	
AUG	CAPE GIRARDEAU	R. G. STOWELL	274	1655	1929	576.45	3676.52	4252.97	

COSTS											
Month	REPAIRS	FUEL	LUBRICANTS	GENERAL SUPPLIES	DEPRECIATION	TOTAL DEPRECIATION SET TO DATE	TOTAL OF COSTS	TOTAL DEPRECIATION SET TO DATE	TOTAL OF DEPRECIATION	TOTAL EXPENDITURES	PRESENT COST	PRESENT VALUE
JAN	39.90				1.73	41.63	1499.28	1540.91	1183.39	1163.99	10599.80	9436.81
FEB	98.43				3.00	99.43	1640.91	1640.34	1163.29	1359.72	10599.80	9340.08
MAR		190.43	20.76	204.56	439.71	875.48	1640.34	2515.82				
APR	250.61				7.81	258.48	2515.82	2774.34	1359.72	1810.53	10599.80	9089.27
MAY	39.90				16.97	55.87	2774.34	2830.11	1810.53	1850.43	10599.80	9048.37
JUN	22.80	171.28	11.07	143.48	19.07	367.67	2830.11	3197.78	1850.43	1873.23	10599.80	9026.57
JUL					9.23	9.23	3197.78	3207.01	1873.23	1834.01	10699.80	8865.57
AUG	260.78				7.84	268.62	3207.01	3475.63				8765.79

MANUFACTURER Northwest Engineering Co. Chicago, Ill. PURCHASED FROM Northwest Engineering Co., Chicago, Ill.

PURCHASE DATE 7/1/26 — ORDER NUMBER K-10226 — SERIAL NUMBER 117741-A — NEW OR USED New — ENGINE NUMBER 1178 — DATE BUILT

SPECIFICATIONS OF MOTOR TYPE Std "8" Twin — City — ENGINE NUMBER — HORSE POWER 60 — VOLTAGE — CYCLE 450 R. P. M.

CYLINDERS Four — DIAMETER OF BORE 6-1/4" — STROKE 8" — MOTIVE POWER Gasoline

REMARKS- 40 Ft. lattice type boom, 30" tread, 12'10" crawlers, 3 sided steel cab, Twin City Engine equipped with Stewart Vacuum Gasoline Feed and Bosch High Tension Magneto Ignition, Engine Equipped with cable std.

*For Clamshell operation, including tools, Size of Tub Yoke 18"x 18"

EXHIBIT I4

October 4, 1927

In replying please refer to
File HAG:B

Mr. P. E. Lamphere (Mr. J. P. Laws)

Will you kindly give me your estimated figures on the following item of Company Equipment (in space provided at bottom of this memorandum):

C.E.# 1641

Present Location Cape Girardeau, Mo.

Description Northwest #105 Caterpillar Crane

Cost $10,753.00 New ~~or Second-Hand~~

Yours very truly,

WESTON J. HIBBS, Treasurer.

By: C. J. B. Dixon
R.M.

Est. Working life in hours 16,000

" " " " months 96

" Repairs $4,300.00

" Scrap Value $500.00

Estimates supplied by J.P.L.

SIZE OF THIS FORM 8½" x 11"

With this summary in hand the card, Exhibit 13, is placed in a special Moon-Hopkins Bookkeeping Machine, and these entries are posted on the card. The machine does this posting very rapidly, is operated electrically, proves the multiplications and makes the additions and subtractions shown on the card.

On the card itself fractions of units of use are dropped which will account for the fact that at times the units multiplied by the depreciation or rental rate will not be exactly correct. We follow the plan of dropping the fractions of the units of use on this card but allowing the dollars and cents to be actual figures because it is not convenient to post fractions on the cards.

This Equipment Record Card No. 13 is the most important card we have, as it is a record that is constantly studied to see how we are coming out with our estimates.

At least once a year we make a physical survey of each piece of equipment to check up with our estimated life and estimated depreciation. Once having satisfied ourselves that our rental or depreciation rates are incorrect we do not hesitate to immediately correct them. If a job is still under way at the time the correction is made, and the change is of any considerable amount, we do not hesitate to back-charge the job or back-credit the job. If, however, the job is done on a cost-plus basis and the customer has been advised of the rental, we advise the customer of the change in rental to go into effect from then on and if the rental has been too high, we back-credit the job.

Our general expenses incurred on account of equipment are comparatively small in relation to the value of our equipment or its rentals and depreciation and we prorate this over the equipment on the basis of the percentage of depreciated value of the piece of equipment to the total depreciated value of all equipment. This is probably the simplest method to prorate this and we therefore follow it.

The totals on the Summary of Company Equipment (see Exhibit 15) agree with the controlling accounts in the ledger for these various expenditures so that the total present depreciated value of equipment as shown on the Equipment Record Cards (Exhibit 13) in aggregate equals the balance of the controlling accounts for equipment in the general ledgers of the Company.

When equipment is sold or scrapped, a summary is made on the

EXHIBIT 15

SUMMARY OF COMPANY BUSINESS FOR SEPTEMBER 1927.

Co. No.	Location - Name of Operating Engineer	No. in use	Days in use	Depreciation	Interest	Insurance	General	Repairs	Purchases
27	Colorado, Ill.- R.O.McCormick	54	180 03	98 01	28 35	144	139 82	1773	
28	Colorado, Ill.- R.O.McCormick	355	177 46	248 85	43 84	473	67 34	45 97	
29	Colorado, Ill.- R.O.McCormick	358	177 27	31 500	23 34	5 00	82 44	3 04	
36	New Milford,Conn.- R.H.Hall	358	176 00	2 00 00	14 00	57 48	24 81	1 21 59	
37	Colorado, Ill.- R.O.McCormick	359	1 572 25	45 530	44 25	1 48	160 05	77 26	
38	New Milford, Conn. - R.H.Hall	489	5 134 50	1 71 190	201 84	36 69	332 78	2 385 52	(831)
40	New Milford, Conn. - R.H.Hall	584	201 23 33	4 093 25	3 05 95	123 83	601 25	6 9 36 69	
								111	

Grand total Page No. 17.

face of the Equipment Record Card (Exhibit 13) showing the final results as regards depreciation, repairs, interest, insurance and general expense, etc.

In the general ledgers we carry a reserve account entitled "Provision for Maintenance and Repairs of Company Equipment," and similar reserve accounts for Marine Equipment, for Automobile and Truck Equipment and for Tractor and Trailer Equipment. Into these accounts are closed monthly the costs of depreciation, interest, insurance, general expense and repairs of the respective equipments and to them are credited the rentals.

We also carry in our general ledgers a reserve account entitled "Provision for Company Equipment Sales" and similar reserve accounts for Marine Equipment, Automobile and Truck Equipment and for Tractor and Trailer Equipment.

Then if equipment is sold or scrapped and there remains on the Equipment Record Card some value undepreciated this amount is credited to the Equipment asset account and charged to this Equipment Reserve account. Should the reverse be the result then this entry is reversed. These reserve accounts will always indicate the variance with actual depreciation of all equipment worn out or sold, and the first mentioned reserves, that is, "Provision for Maintenance and Repairs of Equipment," will always show the amount of rental accumulated as an offset to the repairs accrued but not yet made.

These reserve accounts are not necessary for Work Order Equipment as the work orders bear all of these expenditures of this class of equipment.

We cannot hope to come out right with all our estimates on individual pieces of equipment but we can expect to become sufficiently familiar with our costs to come pretty close to the actual in classes of equipment.

Of course, there are certain classes of equipment, such as heavy drag-lines or steam shovels, that are mostly used on jobs of long duration where frequently both repairs and depreciation will fluctuate violently between jobs, according to the nature of the soil. Such conditions we must meet by an adjustment of the rental but the more data we accumulate on this question the more we will know about our work and the closer we will be able to estimate.

In closing this article I would like to add that in discussing

equipment with contractors I have found that many frankly admit their inability to forecast the life in use of equipment or to forecast repairs and that they make very little effort to do so.

Without this knowledge I do not see how one can decide to the best advantage what equipment to use.

Inquire of almost all other lines of industry what is the rental cost of equipment of any value and you will find large compilations of records made in order to try and arrive at these figures.

I have found that many contractors frankly admit they evade this rental question by placing in advance an arbitrary value to be used for a piece of equipment when the job is completed and then charging to the job as the depreciation for the job the difference between this arbitrary value and the purchase value or the book value if not new when the job commences. Then they immediately begin to estimate this value at the end of the job by what they think they will be able to get for the equipment if sold at that time. This immediately subjects the rental to a rise and fall with the market demand at the completion of the job, and who can forecast this? Suppose a contractor starts a job requiring two years to complete. The difference in the market demand between the time of starting the job and its completion may be such as to make any estimate absurdly high or absurdly low and through no fault of the estimator. Apparently under such a method as this the recording of use of these equipment costs looks almost useless because such costs will at times be materially affected by the market demand which rightfully has nothing whatever to do with the question of use of equipment cost.

I honestly believe every effort should be made to keep this plan out of the picture. Its insertion only darkens the picture when what we need is as much light as possible.

My final plea is that with the small margin of profit upon which we as contractors operate and the little known on this question of cost of use of equipment among contractors generally, I think we should lean toward getting light on the question rather than evading the issue by arbitrarily establishing rentals which may land us in the position of sometimes being obliged to take up a heavy loss, and I also plead that a safe and sound rental made up of a fair allowance for what constitutes the actual resultant costs is the only solution for the contracting industry as it has been found in the past for other industries.

Waste and Its Elimination

By

PAUL E. HOLDEN,

Professor of Industrial Management,
Stanford University, California

and

WILLIAM S. FORD,

William S. Ford & Company,
Milwaukee, Wis.

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Vol 9 No 14

EDITORIAL DEPARTMENT NOTE

The current publication is a double number dealing with waste elimination. The first paper is a good summary as to what the problem is; the second is a paper dealing with some suggestions for the elimination of certain kinds of waste.

Professor Paul E. Holden, the author of the first paper, received his B.S. degree from Purdue University in 1915. From that time until 1917 he was with E. C. Atkins & Co., Indianapolis. From 1917 to 1919 he was captain in the Ordnance Department of the United States Army. Upon leaving the army he became production manager of the Canadian plant of E. C. Atkins & Co., at Hamilton, Ontario. In 1920 he left this position to become assistant production manager of the Remington Typewriter Company, Ilion, N. Y.; he became Engineer with the Library Bureau, Ilion, in 1921, and in 1922 was appointed assistant manager of the Department of Manufacture, U. S. Chamber of Commerce. From this position he came to Stanford University in 1926, to become Professor of Industrial Management in the Graduate School of Business. His paper was delivered before a meeting of the San Francisco Chapter and appeared locally in the Magazine of Western Finance and in the Argonaut to both of which we acknowledge the courtesy of permitting its re-publication.

The second paper was delivered before a meeting of our Milwaukee Chapter. The author is William S. Ford who was graduated from the School of Chemical Engineering of the University of Illinois with a B.S. degree in 1907. He was for five years a chemical engineer with the Corn Products Refining Company and American Maize Products Company. He then served for seven years in the management engineering field holding such assignments as in charge of the Department of Efficiency with Montgomery Ward and Company, engineer with the Emergency Fleet Corporation and engineer with Arthur Young and Company. For the past eight years he has conducted a professional engineering practice under the name, William S. Ford and Company, Engineers and Managers, Chicago, Milwaukee and Minneapolis. He is charter member and former Vice President of the Society of Industrial Engineers and is a member of the American Management Association.

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MARCH 15, 1928

THE CONSUMERS' BILL FOR WASTE

By Paul E. Holden

AMERICAN manufacturers, generally speaking, embody the very spirit of confidence, contentment, and occasionally "cockiness"; and why should not our industrial executives manifest a feeling of satisfaction and pride of achievement, with an industrial productiveness infinitely greater than has ever been accomplished before, with unprecedented wage scales, and with a workers' standard of living higher than in any other country in the world, in fact the highest that ever has been known in history? Evidence of this is indicated by the fact that with but 6% of the world's population the United States has 34% of the world's railway mileage, 38% of its installed water power, 43% of its coal production, 52% of its cotton production, 52% of its lumber production, 60% of its pig iron production, 72% of its petroleum production, and possesses nearly 83% of its automobiles.

However, despite this evidence of industrial efficiency, we, as as industrial nation fall short of what might reasonably be desired or expected in the way of productive effectiveness. The extent of this deficiency was prominently brought out a few years ago by a group of eminent industrial engineers in their report "Waste in Industry." These men were conscious of a rather high degree of inefficiency existing in many of our industrial enterprises and set themselves the task of assaying the wastes due to bad management. Probably no report in recent years has so stimulated the thinking of our industrial leaders or provoked more criticism upon the part of those whose pride was rudely jolted.

Startling indeed were many of the findings set forth in this report. First of all these men studied six major industries and found the avoidable waste due to bad management ranging from 29% in the case of the metal trades group, well-recognized as our most efficient industry, to 64% in the case of the men's clothing industry. On an average, the avoidable wastes among these six industries were found to be 50%. If, therefore, these six groups of manufacturing concerns are at all typical of the industrial plants throughout the country, virtually one-half of the time, money, and effort expended in their operation is wasted.

One-half of anything is a very formidable amount, but the real significance of our industrial waste is realized only when we stop to consider that the factories of this country produce on the average sixty billions of dollars' worth of products annually. One-half of that, therefore, is thirty billions of dollars. Now, many are prone to discount the findings of engineers. So, let us say that these particular engineers were only one-third correct in their findings. Then we have an annual waste of ten billion dollars, which is a conservative estimate of the losses in this country annually due to mismanagement of our industrial enterprises. Ten billions of dollars is an amount difficult to visualize even though we have, in recent years, become accustomed to thinking and talking in terms of large figures. To visualize the enormity of ten billion dollars, we find that this sum would have paid for all of the automobiles manufactured in the United States last year, would have furnished the gasoline to run them, and what was left over would have built all of the residences erected during the same period.

This, then, is the cost of our industrial waste. What of the responsibility for it? Here again the engineers rather startled our industrial executives when they laid at the door of management the responsibility for 50% of the waste, 25% being chargeable to labor, and 25% due to public relations, cancellations, and the like. Hence, management with 50% of the responsibility likewise has the greatest opportunity to salvage this waste. With the amount of waste and the responsibility for it established, the next step in such a survey was to point out the causes. These engineers established four major causes, namely: (1) low production due to the faulty direction of men, materials and machines; (2) interrupted production resulting from faulty planning, production control, and so on; (3) restricted production due to restrictions imposed not only by labor, but by management as well, and (4) lost production due to accidents, ill health, defective vision, and industrial hazards in general. But back of all of the causes of waste one source was found to be perhaps the largest contributor. This was the over-diversification and lack of reasonable standardization found to exist in virtually every one of our commodity lines.

Notwithstanding the fact that simplification and standardization have been in recent years pretty generally accepted as a sound business practice, it is doubtful if very many people realize the ridiculous extent to which over-diversification has been carried in numerous commodities. For example, one of our leading hat manufacturers analyzed his records and discovered that his company was producing 3,684 styles and colors of men's felt hats. Each size of hat, moreover, is made in three widths, two finishes, and approximately ten sizes. Thus, this one producer alone is turning out something over 200,000 different varieties of men's felt hats. Now it is the very unusual man who is not able to make a satisfactory selection of a felt hat out of the first six or eight styles that are shown him by the clerk. As a matter of fact, this particular company, upon a close analysis of their sales reports, did ascertain that 90% of their business was being done on seven styles in ten colors, these comprising but 5% of the total varieties which they were producing.

Another illustration is that of single-bit axes—this being the common garden variety of ax with which we are all familiar. An examination of three manufacturers' catalogs revealed the fact that these were being produced in 34 models, 4 grades, 35 brands, 11 finishes, and in 19 sizes. By multiplying these five variables it is easy to discover that a purchaser might exercise his discrimination between 994,840 varieties of axes.

Still another instance is that of grinding wheels. A survey of manufacturers' catalogs revealed an amazing array of varieties amounting to 715,200. How many people realize that milk bottles used to be made in 49 different sizes and shapes; or that there were 78 different sizes of bed blankets; or 44 sizes of common brick; 552 varieties of wire fence; 4,076 varieties of shotgun shells; or 6,280 varieties of paper bags? These examples are but a very few of those that could be cited, but they are typical of the extreme degree to which over-diversification exists in the vast majority of our commodity lines.

The manufacturers are not the only ones who are chargeable with extreme diversification. The distributors have gone equally far. A typical department store was found to be carrying 27 kinds of hot-water bottles, 54 kinds of foot remedies, 68 kinds

of smelling salts, 100 kinds of tooth brushes, 110 kinds of eyelash preparations, 204 kinds of satchet, 347 kinds of rouge, 452 kinds of soaps, 600 kinds of cold creams, 742 kinds of toilet waters, 1200 kinds of perfume, 1300 kinds of face powder. Perhaps this kind of diversification is responsible for the fact that the average life of retail stores is estimated to be slightly less than seven years.

However, the present situation is not quite so hopeless as would appear from the foregoing examples. Tremendous progress has been made within the past seven years as a result of the simplified practice efforts being carried on by the United States Department of Commerce. There are two methods by which manufacturers can simplify and standardize their lines of product: viz., the cooperative method wherein an entire industry, or at least a substantial portion of it through its representative trade association establishes a simplified practice schedule; the individual method whereby individual action of a single manufacturer irrespective of what his competitors may do accomplishes the desired result. It is in the cooperative scheme that the Department of Commerce is rendering such signal service to American industry.

The nature of this service may be well illustrated in the now famous paving brick case, which was the first industry to co-operate in establishing a national simplification schedule. Back in 1921 the manufacturers of paving brick came to Washington and stated that they were producing entirely too many varieties of brick, but could not arbitrarily eliminate any without the consent and cooperation of their customers. These men were told to return to their respective businesses, make a survey of their sales and production records over a sufficient period of years to indicate trends; cumulative figures should then be compiled for the entire industry. After this was done the Department of Commerce invited all of the state highway officials, purchasing agents, engineers, and any other groups having even a remote interest in paving brick, to a general conference held in Washington. This conference was held in November of 1921 and after one hour's deliberation, fifty-five of the sixty-six varieties of paving brick were eliminated. Four months later representatives of the manufacturers and consumers were back in Washington asking that the Department of Commerce sponsor a second meeting in order that

further eliminations might be made. At this second meeting four more varieties were discarded. Every year these men gather in Washington to review the operation of the industry under its simplification schedule and make recommendations as to further eliminations, if these seem to be in order.

At the present time something over 450 industries have enlisted the cooperation of the Department of Commerce in aiding them to develop their simplification programs. These industries represent commodities ranging all the way from carpet tacks to locomotive cranes indicating that virtually every commodity is amenable to some reduction in variety. Some very significant accomplishments have resulted: bed sizes have been reduced from 78 to 4; varieties of sterling silver flatware from 190 to 62; range boilers from 130 to 13; paving bricks from 66 to 4; metal lath from 125 to 24; paint and varnish brushes from 480 to 138; tacks and nails from 428 to 181; hot water storage tanks from 120 to 14; cotton duck from 460 to 94; steel barrels from 66 to 24. These examples are but a few of the projects which already have been carried out upon a national scale. Of course, all of the aforementioned 450 groups have not completed their simplification programs, but more than eighty have nationally recognized schedules which have been in operation from a few months to as long as seven years.

To the fifteen industries first having adopted the Department of Commerce plan of simplification, an inquiry was addressed as to how many manufacturers were operating in accordance with the varieties established as standard. Responses revealed the fact that the degree of adherence ranged from 51% in the case of the bed, spring and mattress group to 99% in the case of range boilers and metal lath. For the entire fifteen industrial groups the average degree of adherence was 79%—an index to the worthwhileness and permanency of this effort.

A second inquiry was addressed to seven of the pioneer groups asking them whether or not their simplification program had really resulted in any financial savings or whether the gains and economies claimed for this movement were largely imaginary. The paving brick industry replied that their annual savings from simplification were one million dollars; and the savings in the

other groups ranged to as high as 250 million dollars in the case of the lumber industry. If, therefore, comparable economies result in the eighty groups which have nationally established product standards, it does seem that a pretty large slice has already been cut out of the ten billion dollar waste.

It frequently happens that certain commodities are not amenable to group or cooperative action, and in these cases the individual manufacturers themselves have simplified their products irrespective of their competitors. One of the large farm implement producers reduced the number of plows which he was producing from 147 to 41. He also reduced the number of wrenches with which his various machines were supplied from 24 to 4. Similarly, the General Motors Company reduced their varieties of so-called minor parts from 13,000 to 2,100. One of our large western railroads made a 46% reduction in the items which they carried in stores and promptly released eighteen million dollars from frozen inventories. A producer of fountain pens and pencils simplified his product and was able to lower his production costs one million dollars a year. One of the large eastern hotel companies reduced the varieties of glassware, carpets, table linen, and some two hundred other items and effected a saving of one hundred thousand dollars per year. In similar fashion one of the well-known food products companies eliminated 89% of the varieties they produced and were thus able to reduce their advertising expenses 78%, lower costs of sales 73% and at the same time increase their sales volume 600%. A producer of men's clothing reduced his varieties of blue serge suits from 1000 to 24 and thereby increased the productive operation of his plant from thirty-six to fifty-two weeks a year and was able to increase his sales 100% and lower his selling costs 35%. Simplification was applied to the products of one of our large shoe companies which reduced their varieties from 7,500 to 100. In so doing they decreased their production costs 31%, increased their turnover 50% and lowered their cost to the consumer 27%. The General Cigar Company made a 96% elimination in the varieties which they produced, cutting their line from 150 to 6 varieties.

It should be observed that this nation-wide movement for sim-

plification and standardization is not single-purposed. From the foregoing examples it might appear as though this were a scheme to increase manufacturing profits. Quite the contrary is true. The distributors and consumers share equally with the producers in any economies and gains accruing from these simplification programs. According to latest census reports there are 118,000,000 people in this country, so by dividing this figure into the ten billion dollar waste we find that it is costing every man, woman and child eighty-five dollars a year to carry this burden—the consumers' bill for waste. Therefore, any reduction in this burden is reflected in the pocketbook of every consumer.

Now what is the cost accountant's interest in this program of variety reduction? It should be very positive indeed. Any simplification of products, for example, carries with it a standardization of raw materials and purchased parts. Purchases thus can be made in larger orders and to better specifications. Increased purchasing power presupposes lower prices, better service and higher quality. At the same time, material standardization makes possible more effective stores control—reduced inventories and increased turnover. Lower prices and lessened investment in stores are two significant indexes of the value of any employee to his company.

On the other hand, the lack of product simplification should in no way preclude the practice of standardization. Tools, machines, stores, supplies—all are subject to standardization with attendant savings and economies. The statement by the head of a large hotel corporation has real significance. He says, "If you cannot simplify what you make, simplify what you buy."

Considered from an entirely different angle, the production man may well be considered the key man in this national effort for simplification and standardization. If he does not support the various simplified practice schedules as they are developed under the guidance of the Department of Commerce, obviously the movement will fail. Any standardization schedule so long as it remains merely a "paper" standard is useless—in fact, worse than useless, as it represents a waste of time, effort, and money expended in its development. However, if those in control of purchases concentrate their attention on varieties and sizes of

commodity lines adopted as standards, then the many evident gains and savings will be realized. Moreover, the degree to which business adheres to these nationally recognized schedules measures the degree to which the whole effort will be stimulated and extended.

THE TECHNIQUE OF WASTE ELIMINATION

By William S. Ford

IN CHOOSING for this brief discussion the topic "Technique of Waste Elimination", I have had in mind the relation of waste elimination to the profession in which you are all interested. Basically the purpose of cost accounting is the elimination of waste in business in all of its forms—wrong selling prices, excessive material, labor, and overhead costs, slow turnover—all of those factors which tend to reduce net profit below a fair standard of accomplishment.

Cost accounting in its broad sense is one of the most useful and potent weapons which management has at its command with which to combat the forces which are always at work tending to tear down and disorganize. Because it searches out the truth and focuses executive attention on tendencies which might otherwise remain unknown until permanent damage had been wrought, cost accounting should have a constantly increasing field of practical usefulness and a place of recognized importance in an industrial organization.

But in order to attain this place, the cost accountant must lay aside the temptation to indulge in elaborate technique for its own sake. Instead, he must of necessity place himself in the position of the stockholders whose money is invested in the company which he serves and, by presentation of his analysis in executive form, sell his services to the men who must hour after hour make the decisions which keep that business sound.

Management Moves Toward a Science. I doubt if the most optimistic and enthusiastic student of management methods would care to say that Management today is scientific—certainly not in comparison with the older and well recognized sciences of mechanics, chemistry, electricity and astronomy.

The Standard Dictionary defines science as: "Knowledge gained and verified by exact observation and correct thinking."

There is no true science except that which rests upon patient observation, recording and analysis of exact facts or indications. Upon that very ground, management, while it may not properly be said to be a science, is moving steadily in the direction of science.

Witness the measurement of the market for Palmolive soaps by trained investigators going from door to door, the business forecasting of the Walworth Manufacturing Company, the material handling systems of the automobile companies, the detailed operation analysis by means of time study carried on by the Western Electric Company, the intensive studies of office methods made by the Insull group of public utilities, the chemical research of the DuPonts, and last but not least in its significance, the methods of cost control used by the LeRoi Company of West Allis and the Briggs and Stratton Company of Milwaukee.

When, therefore, your hard-boiled, "show-me", practical man who believes only what he can see, feel, touch, and smell (his ranks are thinning like the buffalo) says he will have nothing to do with so-called scientific management, you may well agree that there is no scientific management. At the same time you can point out the trend toward the scientific which characterizes the methods of the representative successful corporations today.

The Measurement of Waste. The attention of the country was first called in a popular way to industrial waste by the report of the Hoover "Committee on Elimination of Waste in Industry of the Federated American Engineering Societies", made in June, 1921.

This report is of interest to us here tonight, not alone because of the government recognition of the problem of waste in industry, nor of the recognized standing of the personnel of the committee, nor finally of the startling conditions which it disclosed, but rather because it represents the first large scale attempt to express in definite mathematical terms a measurement of management, an approach which is similar to that used by all far-thinking cost accountants who serve their companies in a broad way.

It would require too long a description to make clear at this time the exact methods used by the Committee to establish their figures.

It is sufficient for our purpose to state that they classified the responsibility for waste into:

1. Management (the executive direction of the business)
2. Labor
3. Outside contacts (trade conditions and factors beyond the control of the individual plant)

The average of all of the data sheets showed that 50% of the waste in industry could be laid at the door of management, 25% at the door of labor, while least of all could be attributed to outside contacts such as trade conditions, etc.

This apparent indictment of management needs a little explanation. One of the great American indoor sports is to point the finger of criticism at management, much of which is meaningless. But this survey took this matter of management seriously and without bias. Since the executives of a business have the greatest opportunities for knowing good from bad and for controlling waste, naturally they must assume a greater share of the responsibility by the very nature of their positions.

Another point well worth noting. If you will look back over the management literature and the discussions of the learned groups meeting to promote better practice, during the last fifteen years, you will agree that a very large proportion has been devoted to a discussion of the efficiency of the workman. He has been an object of attention because his work has been susceptible of measurement by the various instruments that have been devised and his strategic position in the organization has left him but two choices, accept or quit. Today more attention is being given to executive waste.

Outline of Actual Survey to Locate Waste. We will assume that you are assigned to make a business survey of a plant which, by comparison with another similar plant, should have made $100,000 in profit for the year, but, instead, just broke even. You are instructed to locate the waste in that plant and offer a sound plan of reorganization such as will justify the continued support of the banks.

With that job ahead of you, you will have to exercise a happy combination of your best skill to get the facts with practical

common sense and judgment to convince those business men whose money is involved.

Of course, your first step will be to examine all of the figures available and familiarize yourself with the relative proportions of the elements of manufacturing, selling, and administrative costs, to determine what division or activity of the business has the greatest effect on net profit. You certainly would not want to spend your efforts on a study of office methods if that cost represented only 3% of the total, and neglect material which might be 75%.

After you have studied these figures you may then map out your campaign and know what importance to attach to what you observe. You will divide your examination into three main divisions:

Manufacturing
Selling
Financing and General Administration

Then you will arrange the subjects which you want to study under each one of these divisions.

MANUFACTURING:
Executive Organization
Land, buildings, equipment
Manufacturing methods
Material and production control
Cost control
Technical engineering, design and research
Personnel

SELLING:
Executive Organization
Sales Force
Advertising
The product and the market
Sales methods

FINANCIAL AND GENERAL ADMINISTRATION:
Executive Organization
Accounting and financial control
Office routine

In taking these subjects up one by one we will try to illustrate, at least roughly, how an actual job of surveying and reorganizing a plant may be carried out.

Manufacturing Division

Executive Organization. The first point of examination is the executive organization of the manufacturing division.

How are you going to judge an executive organization? How are you going to be just and fair in your appraisal of the waste due to wrong executive organization?

You will not get it by a slide rule, or a tachometer, or a stop watch. If you have eyes and ears, and experience to direct them, there are signs which are as plain as a billboard and clear as a loud speaker. As you go through the plant for the first time you are alert to new impressions. If there is long standing disorder on the floor and in the stockrooms, if men meet you half-sullenly, if here and there you run across groups of two or three men apparently waiting for something to happen, you need no palm reader to tell you the personality of the directing head of that plant. If on the other hand, you see an army of clerks and supervision, you know that you have another situation to deal with. You may depend upon it that your first day's impressions, if you have gone about your work systematically, will prove a very dependable guide.

From your experience with manufacturing plants, you know that there are certain essentials of good organization and you proceed to see if these are present. If the plant manufactures an assembled machine, you know that there must be a properly organized engineering department, that the sequence of work must be planned for purchasing and fabrication, that there must be some control over inventory, that there must be reliable knowledge of cost, etc.—all of this without so-called red tape. There must also be departments to take care of employment, maintenance, inspection, etc. You will next see to what extent these necessary departments are present and how they work together.

The quality of executive leadership with respect to discipline, progressiveness in step with modern business trends, ability to

inspire cooperation and organize the efforts of associates, will concern you as a possible fundamental cause of waste.

Figuring that every $1200 a year salary costs approximately one cent per minute, it is possible to make a reasonably accurate estimate of the actual waste in executive organization cost.

Land, Buildings and Equipment. Continuing with your survey you will next logically examine the location, arrangement, and character of the real estate and equipment. Since in all probability it will not be possible to relocate the plant, erect new buildings, or make extensive installations of new equipment, you will concern yourself primarily with making the most of the plant as it stands, with the very minimum of adjustments.

Waste due to real estate and equipment may roughly be classed under the following heads:

1. Relative location of departments
2. The internal arrangement of departments
3. Facilities for the movement of material
4. Adaptability of the machinery and equipment to the necessary manufacturing processes
5. The condition of equipment, etc.

You may set up a rough model of the plant, lay down blue prints of the various floors at the different levels, and by means of colored strings trace out the movement of material from department to department and from machine to machine. In cooperation with the practical men of the plant you may then work out a tentative practical rearrangement which will simplify the handling of material. The waste in the movement may be estimated by measuring the length of the strings in the old arrangement as compared wth the new.

The report on the waste due to equipment will further involve a careful examination of the condition of equipment, whether or not it is the best for the purposes, etc.

Your final report on this section should contain a statement showing the savings which may be made by certain practical rearrangements and an estimate of the actual waste now existing.

Manufacturing Methods. Your survey on manufacturing methods must show what savings can be made by improvements in manufacturing methods.

It will probably not be possible to take time to examine every process in the plant. Instead you will make certain test studies. If it is the machine shop you will examine the speed used on representative machines and make some time studies to show the average efficiency.

If the plant involves technical processes you may have to call in a specialist who is familiar with the technique of that business.

To dwell upon waste in manufacturing operations would be an endless story.

But remember this—back of what you think you see in ordinary every-day observations there are wastes which if fully realized would startle you into the most drastic action. The only way to visualize them is by means of time study and other means of orderly analysis.

Material and Production Control. The expression "production control" has been used so indiscriminately that it has long since ceased to have a definite meaning. There is a wide difference between a production record keeping department and a production control department.

In your examination of the operations on machines you will already have noticed the waste due to breakdowns and other interruptions caused by shortage of material and by wrong sequence in putting the material through the production departments.

Your experience with similar plants will have indicated what you should reasonably expect in the way of results from a properly organized production department.

Your report will present an estimate of what the cost of proper handling of material and production control should be and provide an estimate of the preventable waste in the plant which can be relieved through better control and reduction in inventories.

Cost Control. Your first study of cost department waste will be in the way in which the activities themselves are handled. You will find what the routine is and how far it is possible to go in eliminating work which is not producing results.

But the important thing above all is to measure how much value that department is to the operation of the business. You will obtain an estimate of how much waste there is in the busi-

ness as a whole due to cost misinformation or failure to use the information which is furnished. The tragedy of cost accounting frequently lies in the fact that the internal operation of the department is excellent, but, due to indifference on the part of the management or other causes, much of the work goes for naught. A business can be quickly brought to a state of financial embarrassment through misinterpretation of cost figures or through failure to use them.

Technical Engineering and Research. When you come to the study of the question of technical engineering and research, you have a situation which calls for all of your best skill and judgment. More and more in these days does the engineering and research division of the business govern leadership in competition with other products and with the methods of other companies. On one hand is the problem of keeping the nature of the product itself in advance of competition. On the other hand is the preparation of specifications for economical manufacture and the development of processes which will meet the price competition which your sales division must meet.

You must tell these bankers how much the company is wasting due to improper design and development, to failure to keep up with competition and the demands of the market, and failure to examine operation methods systematically and with an open mind.

We want to emphasize especially research with regard to management methods, i. e., management or industrial engineering, as it is variously called. You will want to include in your report an estimate of what might have been saved had there been a Management Engineering or Methods Department, and how much it should save above its total cost in the future.

Personnel. Your section of the survey relating to personnel will tell of the wastes due to poor employment, high turn-over, insufficient instruction, improper methods of payment, etc.

For example, the expense of installing and training one new employee costs from $50 up. The average efficiency of employees working without some special financial incentive which rewards extra effort varies from 50% to 70% of a fair standard.

Knowing the payroll cost for the year you can arrive at a very

close estimate of the cost reduction which should result from better control of personnel.

Selling Division

A short article such as this can scarcely more than suggest the method of analysis of wastes in marketing.

The use of "hunches" is being discarded in favor of systematic tests of the market, the use of carefully assembled facts and well planned campaigns.

The measurement of waste in marketing is a distinctly specialized field, the technique of which is ably described in certain late books on market analysis.

Financial Division

You will examine excessive accounts receivable, lack of control of expenditures, mounting inventories, accounts lost through poor handling of credits, errors on invoices, etc.

You will make a series of calculations to show the variation of unit cost with volume and outline a general policy with regard to price maintenance.

The efficiency of methods of accounting and office control will receive your critical attention both from the standpoint of their economical handling and their usefulness to the business as a whole.

Summary of Report

You will be able to present in your summary a very reliable statement of the amount of waste in the manufacturing departments and what must be done with executive organization, the buildings and equipment, the manufacturing methods, material and production control, costs, technical engineering and personnel to bring about this saving.

Your summary will tell also of the results of your observations of the selling methods, of the service to the customer, the way in which the product meets the demands of the market, of how effective your sales force is.

Your summary will analyze the financial record of the company for the past years and disclose waste in excess investment, in lost accounts, in excess cost due to lack of budget, etc.

Lastly, you will state in a final figure what that business should have done which is the measurement of the waste.

Because in this brief paper, we have had to hurry through subjects, any one of which might well occupy our undivided attention it may appear that we have asked you to accomplish the impossible in preparing an intelligible report covering so many subjects. The message we want to leave with you is to offer the basic classification for a waste survey which was given and to emphasize the fact that it is possible to evaluate the waste in a manufacturing or mercantile business and prepare an intelligent practical program which will do much to reduce waste.

The Field of Cost Accounting in Waste Elimination

The cost accountant is, or should be, in a strategic position to know as much about waste as any executive in the organization.

The field of the cost accountant is broadening. He is no longer confined to mere tabulating of figures for some one else to try to interpret. He is the interpreter and the spokesman for those forces in business which are working toward cost reduction, good customer service and better net earnings for all concerned.

It is through the cost accountant that the technique of waste elimination may be most logically developed.

Depreciation As Applied to Public Utilities

By

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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Vol 9 No 15

EDITORIAL DEPARTMENT NOTE

Depreciation is always with us, whether recognized by name or not. Since the first federal income tax law of 1913, open consideration of it has been forced on all business as never before. Whether it has really been taken into account in the formulation of basic business policies more since 1913 than before there is no way of determining. Certain it is that in the determination of taxable net income it has been taken into account since 1913 quite generally.

Depreciation always has been and always will be an individual problem. Uniformity of amounts, rates, and treatment can seldom if ever exist. There are certain principles which are fundamental but their application must always be individualized. A good deal of loose thinking has been done on this subject of general interest and we are glad to present this paper by Mr. Winans as representing a carefully considered view of some of the problems entering into the determination of a suitable depreciation policy. This paper was presented before a recent meeting of the New York Chapter, N. A. C. A.

The author, W. B. S. Winans, is Assistant General Auditor of Henry L. Doherty & Company, operator of Cities Service Company and its 150 public utility and oil subsidiaries. He has been with the Doherty organization for sixteen years and in the public utility and oil business for nineteen years.

He was graduated from New York University School of Commerce in 1906, with the B. C. S. degree. The training received at the University; that gained while connected with a firm of certified public accountants; and his many years of subsequent accounting experience have given him a broad and practical understanding of accounting principles and problems.

For many years Mr. Winans has been interested in the accounting activities of the National Electric Light Association and served as Chairman of the Accounting National Section of that Association during 1926-27. He also acts as Councillor of Economics, Accounting, and Statistics of the National Petroleum Association and is a member of the Accounting Committee of the American Gas Association.

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DEPRECIATION AS APPLIED TO PUBLIC UTILITIES

DEPRECIATION is one of the most discussed and least understood subjects confronting accountants, engineers, lawyers, bankers and business executives. I have never known any one who claimed to be completely informed on this subject. There is much difference of opinion and there must be much ignorance regarding theories and practices as long as economic changes are continually evolving new processes and new facilities. The airplane as a means of transportation and the radio as a means of communication are new forms of business with scant experience records.

The guiding factor in a determination of depreciation policies is conceded to be experience and as experience in numerous lines of business has been short, it is small wonder that many of us are confused in determining a policy of depreciation.

No one method for all lines of business, nor any one method for any two businesses in the same line can be utilized in choosing depreciation policies. Each individual business organization must be studied carefully and its reserves based upon the requirements of that business. The determination of depreciation reserves and depreciation rates is not a mechanical or mathematical problem, but is a product of experience based on an intimate knowledge of an individual business, and should rest with a joint body of engineers, accountants, and business executives.

What Is a Reserve?

We, as accountants, are too apt in thinking of corporate reserves to look for a book account which records a credit balance set aside for a particular purpose. If we find an item called Retirement Reserve or Depreciation Reserve we are inclined to think it representative of all that the company has reserved for this purpose. This may be true from the book standpoint of corporate action, but in itself does not reflect the true situation from the standpoint of stockholders or bondholders. The total reserves available for all contingencies, or for replacement of property, include not only designated reserves but also any balance in the Surplus account, which may not be required for a contractual relation or against

which dividends have not been declared. The surplus account is as much a part of the company's reserve as is the special account set up on its books for that purpose.

Frequently in examining a balance sheet of a corporation, the layman expects to find the reserve on the asset side and cannot understand why it should be on the credit side, where to his mind it represents a liability. He asks, "Where is the cash?" In very few cases are replacement reserves deposited in special funds, as it is found more profitable for a corporation to invest such reserve earnings and surplus balances in its business in new facilities or in current accounts, thus avoiding the necessity of borrowing money or securing capital from shareholders.

Distinction should be made between a depreciation reserve and a reserve for amortization of capital or obsolescence. The cost to a company caused by catastrophe or by economic changes is something that should not be confused with physical property depreciation or retirement reserves, and should be given separate consideration. As a matter of fact, losses caused by economic changes, subject to amortization, are usually in proportion to the ability of the management to foresee such conditions and to keep in step with the times. Therefore time, or use of facilities, is not as much of a factor in the determination of business amortization as is quality of management.

Electric Utility Reserves

The practice generally followed by electric utilities is in accordance with the Uniform Classification of Accounts prepared by the National Association of Railway and Utilities Commissioners, adopted by that body in 1922 and since that time by 27 states. In this classification of accounts the term depreciation is not recognized. The so-called depreciation theory is discarded and the retirement theory is recognized.

This theory presumes that expenditures for current maintenance will keep the company's property in normal operating condition and that retirement of units will be charged from time to time to an established reserve account.

The retirement theory is based upon the premise that a reserve will be set up out of earnings or out of surplus to a point where

reserves represent a safe amount as a back-log for emergencies and large replacements.

In an average electric utility this theory, over a period of years, would accumulate a reserve balance equal to from 10% to 20% of the depreciable property account, and thereafter this amount would not be added to unless the property was expanded.

A public utility, particularly an electric company, is not built all at one time, but piece by piece, and wears out in the same way. As each unit therefore has a different life, it follows that an electric utility property will never be completely depreciated.

It is also a fact that repairs are continually made which increase the original useful life in proportion to the extent to which these repairs or small replacements are made. If an electric company replaces a pole here and there in its distribution and transmission lines, the replacement of these poles will be charged to maintenance accounts. Depreciation in such instances will be automatically taken care of and will not require a reserve.

The Classification of Accounts previously referred to allows the amount of reserve to be charged either to an account called Retirement Expense as a part of operating charges, or to Surplus. This classification also provides for an account to be placed on the balance sheet called Property Abandoned, which is a suspense account for the purpose of recording retirement losses on property destroyed or abandoned because of replacements, of obsolescence, etc., when such loss has not been provided for through a reserve. Amounts placed in this account are amortized through annual or more frequent charges over a determined period.

This practice recognizes that some equipment is discarded before it has worn out, due to economic changes not anticipated. The machine that is fully efficient today may be obsolescent tomorrow. The utility does not know how to apply life tables to such abandonment, but accounts for them as such instances arise.

The condition of a business or the condition of its physical facilities should not be judged by the situation in respect to one machine, but the over-all property condition must be reviewed in respect to continuous service or continuous production. The methods discussed, as prescribed by the classification referred to, result in a self-insurance applied to depreciation, the reserve accumulated on a company's records acting as a cushion to cover sizable losses.

Methods for Setting Up Reserves

There are five generally accepted methods of setting up corporate depreciation or replacement reserves, viz.: the Straight Line Method; the Sinking Fund Method; the so-called Wisconsin Method; the Per Cent of Gross Method; and the Method which sets up from time to time whatever the profits of the business warrant.

The Straight Line Method. The Straight Line Method depreciates property over a period of years at an average rate per year. If this policy is continuous and no new investment is made, it will result in a complete wiping out of the property account at a given time. The depreciation rates determined for the yearly charge are derived from an analysis of the property and from the estimated life of its different parts. The Straight Line Method is based on a uniform loss of value over a definite period of years.

The Sinking Fund Method. The Sinking Fund Method endeavors to set up such a rate of annual depreciation, based upon the life of a property, which, together with interest at a fixed rate, will yield a sum of money necessary to replace the original cost of the property at its theoretical death. This method, being complicated and requiring careful records and calculations, has not been generally adopted. It requires the use of a fund in which the reserve will be deposited.

The Wisconsin Method. The Wisconsin Method is a combination of the Straight Line and the Sinking Fund methods. To a straight line calculation there is added a rate of interest on the balance in the reserve account on the premise that moneys equal to the reserve set up have been reinvested in the business. In this method the interest account of the company is charged with the annual interest and the depreciation account is credited.

The Per Cent of Gross Method. The recent practice of bankers in connection with depreciation or replacement provisions in indentures, covering mortgaged property of an electric utility, requires reserves to be set up on the basis of its gross business. While various rates are used and are defined to cover both maintenance and depreciation reserves, in electric utilities they average between 10% and 15%. In this plan the reserve set up is contingent upon the amounts charged to maintenance expense. Thus

if a total reserve of 10% of gross is required and the maintenance cost is 6% of gross, then the amount placed in reserve will be 4% of gross earnings. This plan has been based on experience and has been widely adopted, although it does not at first glance seem to be adaptable from an engineering standpoint.

The Profits Method. The method frequently followed is the practice of setting up in reserve whatever the profits of the business warrant. Needless to say, if there has been no profit or if there is no surplus account, no true reserve can be placed on the company's records. This basis has, after all, some advantages, especially during the early life of a business enterprise when profits are frequently small and when, as a matter of fact, very little depreciation reserves are necessary to represent the use or wearing out of facilities. It is quite reasonable that during a profitable year a large amount might be reserved for this purpose and during a relatively unprofitable year a smaller amount.

Size of Reserves

The size of an appropriation for reserves or the size of a reserve balance at any particular time depends upon a great many factors. A study of numerous electric utility properties and their reports indicates that a utility property may be well maintained if the costs reflected in operating expense covering all its maintenance accounts are somewhere between 2% and 7% of its gross earnings, or between 1½% and 3% of its depreciable property. How much in addition to such maintenance costs should be set up as a reserve depends upon the various factors to be reviewed, such as the actual physical condition of property; the amount of reserves already in existence; the kind of construction; the care and foresight used when the work was originally surveyed, designed and executed; the classes and extent of property embraced in its physical structure; and its general policy of current maintenance. Dependent upon all of these factors, 1% to 4% of the depreciable property value might be reserved.

Experience of one large electric utility company shows that over a period of five years a reserve for replacement set up on the basis of 3% of the depreciable property was three and one-half times the amount necessary to cover current replacements. In this par-

ticular company the time will soon come when the annual reserve will be greatly reduced because of the fact that current maintenance will take care of its ordinary costs and it will have created sufficient reserve to take care of other items as they arise.

An electric utility company, having a large proportion of its investment in a high tension steel tower transmission line, would have slight reason for setting up a depreciation reserve of any size. Its steel towers, properly protected from the weather through maintenance, would not deteriorate; its bare copper wire would not deteriorate and there would be no depreciation of the insulators, as an insulator is always in 100% condition until it is broken and is then absolutely useless. The replacement of insulators would be taken care of from day to day in order to insure continuous operation and these replacements would be charged to maintenance accounts. Certain climatic conditions, storms, and some deterioration of wire caused largely by the fastening of wire to insulators will exist, but this would largely be taken care of through maintenance. There may be some obsolescence due to insufficient capacity, but such a condition would be subject to the rules of property obsolescence.

From the standpoint of physical property depreciation, the reserve should equal the amount of money necessary to place the existing property in as high a state of efficiency as when new.

Retirement or Abandonment of Property

Most large companies have a property record in which is listed the book cost of all property owned by the company. In case of replacement or retirement of property this cost is utilized in making an entry to record the retirements. However, there may be occasions where it would be incorrect to use this book cost in case of property replacements. To illustrate: In the original cost of a project there may be included an amount of from 15% to 25% of its total which covers survey, design and field expense. This portion would not have to be duplicated upon a replacement of the property. This work having already been done, expenditure will not again be required for this purpose to as great an extent and therefore these items, or a portion of them, might very properly remain in the plant and investment account. This should be a con-

sideration not only in the determination of amounts to be retired from property accounts, but also in determining the amount of reserve to be established.

The practice in case of retirement or replacement is to remove from the plant account the book cost of the property which, together with reclaim or dismantling costs, less salvage, is charged against the reserve account. In a replacement undertaking the cost of the new facility would then properly be chargeable against the plant and investment account.

It is important that a uniform and consistent policy be reduced to manual form, defining items which are properly chargeable to maintenance and items which are properly chargeable to reserve, and that strict adherence be given to its definitions.

A consistent policy covering these items is important as all too frequently decisions covering their distribution, left to the accountant or to the plant superintendent or others, result in a lack of uniformity and in meaningless accounts.

In preparing this manual the property of a company must be carefully reviewed and the line drawn between replacement and maintenance expenditures. The best practice in determining the dividing line is to list the units of property, the complete replacement of which would result in a charge against the reserves of the company. In the case of an electric company this is somewhat difficult to determine in respect to its electric lines, unless a certain number of feet of line replacement is utilized as a unit or a certain number of dollars is utilized for determining whether the charge should be made against reserve or maintenance accounts.

In instances of replacement caused by obsolescence or inadequacy many authorities have concluded that the capital cost of the new facility is, in part, the obsolescence cost of the old unit and that such total costs may be charged out over the life of the new asset.

The building of transmission lines and consequent full utilization of large economical power producing units may have caused small power units to be shut down or retained for reserve or standby service. It does not appear that a loss of property value has accrued by reason of this change when a higher class of service is rendered; when the change has brought about a large increase in available production and a reduction in costs per unit of produc-

tion and a release of labor and material to other industry. The nation or the section served having gained, can we say that the utility has lost?

Corporate Records and Reports

The property record, in which is shown a detailed list of company-owned property, together with its retirement data, has been previously mentioned.

The general ledger of the company will reflect a reserve account which will also show retirements from property as they are made from month to month. Inasmuch as the National Association of Railway and Utilities Commissioners' classification provides only one reserve to cover all amounts set aside for this purpose, there will be no record maintained of accruals to the reserve by classes of property or items of equipment.

Opinions differ as to whether a depreciation or replacement reserve should be deducted as an operating expense in a company's earnings statement, whether it should be charged directly to its surplus account as an allocation of its corporate surplus, or whether it should stand out as a separate deduction from income in the same manner as interest charges for the period are deducted.

In the case of some large companies it is the practice to report balances available for earnings and reserves because of the realization on the part of the executives of those companies that they do not know how much to charge against current earnings. Where such companies own large blocks of real estate, continually increasing in value, and in the case of oil companies owning leaseholds that may have a value far greater than their book value, the question sometimes arises as to whether accrued appreciation not ascertained does not more than offset accrued depreciation not yet ascertained.

I think we agree that the best practice certainly will not group an undisclosed amount with operating expense, but will clearly disclose to the public the amount which has been allowed for this purpose in arriving at corporate profits.

In one large industrial corporation I find included as an item of operating expense an account called Depreciation and Sinking Fund on Bonds. This does not indicate to the public either the

amount of the depreciation reserved or the amount of the sinking fund.

In issuing balance sheets of their affairs, many corporations deduct their reserve for depreciation from the plant account. In some cases reports indicate the amount of this deduction and show the net figure, while in other cases the net balance is simply stated as being less depreciation, without showing either the amount of depreciation or the total amount of the plant account. This results in a lack of information and is undesirable. The amount of accrued reserves should be plainly stated on a corporation's balance sheet.

The question still remains as to whether depreciation or retirement expense is a shrinkage or wastage of capital and a part of capital risk, or whether it should be viewed as an operating expense. Inasmuch as reserves for this purpose are largely an estimate, and the amount chargeable to the current year is difficult to determine, I believe that such charges might more properly be made directly to the surplus account.

General

The Interstate Commerce Commission has issued an order, which is still in the hearing stage, requiring railroads to set up depreciation on various units of property, not only during future years but to set up a reserve which will record the amount of past depreciation as of January 1, 1928. The setting up of depreciation on an annual basis cannot be exact in a railway company. Classifying such items by units of property, and from this classification determining the proper amount of annual depreciation, is a most difficult procedure when viewed in the light of past experience. It must be even more difficult for a railroad to set up a reserve recording the accrued depreciation in existence since its beginning, as required by the Commission's order.

A careful review of all maintenance accounts, investment accounts and consideration of the opinion of those qualified to know the condition of physical property, are essential to the determination of such a figure. That this determination can only be an approximation goes without saying.

Imagine the difficulty of determining accrued depreciation in a

situation such as this. Twenty years ago a railroad in the United States had a single track line between two large cities. The weight of the rail was 90 pounds. The tires were small and of ordinary chestnut wood. The roadbed was cinder-ballasted. Bridges and trestles were of wood. At that time this equipment was adequate for the amount of traffic passing over it. When we look at that road today we see two gleaming railroad tracks of 120-pound rail, with creosoted wood ties, rock ballast and bridges of steel. The present structure is in no respect similar to that which existed twenty years ago, except as to its route, and even this may have undergone change. Curves may have been straightened out, tunnels changed into cuts and grades reduced. Some of these changes have increased the plant and investment account of the company, but a portion of them has affected ordinary maintenance accounts and operating costs through extraordinary replacements. Certainly, in such a situation, which we know exists in many large railroads in the United States, there can be little, if any, accrued depreciation. It is my opinion that setting up an estimate to account for the accrued depreciation in a situation of this kind might result in an increment of value rather than in a shrinkage requiring a depreciation reserve.

The order of the Interstate Commerce Commission referred to was presumably subscribed to by its chairman, the Hon. Joseph P. Eastman, and in this order the railroads are ordered to set up their depreciation on a straight line basis. This is hard to reconcile with an address made by Mr. Eastman at an annual meeting of the Railway Accounting Officers' Association in May, 1920, at which time he was a member of this Commission. Mr. Eastman said in his address:

> "It seems to me that the practical use of a depreciation reserve or fund is not to act as an offset to the theoretical depreciation of the property, but to provide what may be called either a balance wheel or a reservoir, so that the company may be in a position at any time to make the renewals or replacements which first-class up-to-date service demands, without varying from a regular and even burden upon its operating expense. In the case of certain classes of property it may be that the annual replacements, when the property is well maintained, average up in such a way that no reserve is necessary,

yet the accounting should disclose whether or not this standard of maintenance is observed. What is true of one carrier also may not be true of another and care must be had not to prescribe rigid rules which make insufficient allowance for such variations."

The railroads are not favorable to this order and have protested against making it effective.

We have all been prone to believe that a high depreciation policy is a desirable thing and have frequently not given consideration to the abuses which have been the result of accruals on too high a basis. Many corporations have in the past, by reason of high depreciation accruals which have not been fully disclosed to stockholders, reported earnings to the public which were materially less than real equities accruing to the stockholder. There are two cases which are almost flagrant in this respect. Small earnings were reported by these companies for a period of years and the market price of their securities was correspondingly low. During this period those who were familiar with the companies' methods of accounting and reporting were accumulating the securities of these companies and profited after the property account had been practically extinguished and the amount of annual reserves reduced to a figure which was more fairly representative of the amount chargeable against earnings periods. From the standpoint of the public, therefore, much is to be said against setting up reserves which are excessive.

The public utility has consistently maintained that the reserve account has no relation to its investment in property and that its reserves must not be deducted from its property accounts; first,, because reserves are an estimate; second, because in any event they do not represent accrued depreciation, from the standpoint of service rendered to the public, if the property is maintained in 100% operating condition; and, third, the public utility is entitled to a return on the gross value of the property, even though a reserve has been created by prudent management.

To deduct the depreciation or replacement reserve account from the property account of a company would be just as illogical as to deduct the surplus account from the property of the company.

In substantiation of the position of the electric utility in respect to the deduction of reserves from property accounts, I quote, in

part, from a decision of the Kansas Supreme Court in the case of the Southwestern Bell Telephone Company:

> "The Telephone Company received from the public a certain amount which it was entitled to use either as a return upon the investment or as a reserve for depreciation. It was entitled to both. If there is a balance in the depreciation fund, as claimed by the state, that balance exists because the stockholders, following the ruling of the courts that they must first provide a depreciation reserve, have foregone their earnings and accumulated a reserve."

In the case of the Bronx Gas & Electric Company vs. the Public Service Commission in the New York Supreme Court, it is stated:

> "If no reserve had been provided for, that amount doubtless would have been available for dividends. To the extent that the earnings may have been withheld from stockholders by whatever means, either for the creation of surplus or reserves, and such earnings have been invested in the property, the stockholders have increased their investment just as effectively as though the earnings had been distributed and then reinvested in the stock of the company."

There have been numerous court decisions which clearly state that valuations of utilities for rate making purposes must not be reduced by the amount of accrued depreciation on the companies' books, nor must such valuations be reduced by the amount of accrued depreciation calculated on any theoretical basis. Such a deduction, if made, must only represent the sum necessary to place the property in as high a state of efficiency as when new.

Were we to follow the desires of some people in respect to the setting up of the plant account and the reserve accounts, there would be a time when there would be no return whatsoever to capital because of the theoretical plant extinguishment by reason of reserves based upon life tables. A popular notion has been that any piece of property has a maximum life of twenty years, and we have all followed, in many respects, the dogma of theorists regarding property lives.

There are many examples of long life property and each one of us can think of many instances that will quickly drive from our minds the idea that the average life of property is about twenty years. There is no fixed and fast rule that can be followed in re-

spect to rates of depreciation or rates for replacement. The history of each business must be thoroughly understood and a thorough knowledge of the condition of the company's property as a whole must be had.

The subways of New York City have been in operation for over twenty years and I personally cannot see any apparent depreciation. Certainly they are just as useful as they were more than twenty years ago.

One of the old Roman aqueducts built more than 100 years before Christ is still supplying Rome with water. We cannot imagine any theory of property lives that would have covered such a situation.

The time factor, which seeks to establish a period during which disintegration will take place, is very uncertain. Mr. George N. Webster, in a pamphlet entitled Theoretical Depreciation, has commented upon this and I quote from his remarks:

> "A celebrated lawyer who died within the year, and who bequeathed many millions of dollars to a great college, had in his office the simplest and oldest furniture the writer ever saw. Furthermore, his earning capacity increased annually to the day of his death at the age of 74. He probably never realized what a liar he was making out of the professional depreciator."

The so-called professional depreciator pounces on the depreciation item as a vulture would its prey, seeing only the amount of dollars involved and anxious to report with great glee that the provision for this purpose is too low. Was there ever a case where a report stated that the amount was considered excessive?

Contrary to general opinion, the electric utility is not a monopoly. Its competitors are independent electric plants, coal, gas, oil and water power. To retain its customers it must maintain rates that will not drive industry to other locations or to other forms of energy. It is, therefore, interested in cost finding and consequent rate calculations.

The duties of a corporation in respect to reserves are many-fold. It has a duty to its stockholders neither to understate nor overstate profits. It has a duty to the public who depend upon the corporation for continuity of service. It has a duty to the bondholder

and a duty to the investing public generally, who are dependent upon corporation reports in making investment decisions.

The corporation has the obligation of keeping costs, and, therefore, selling prices as low as is consistent to insure the largest possible use or consumption of its product and, theoretically, a larger profit to itself.

If low costs and low prices could keep production capacities running on a 100% basis, the situation would be ideal for producer and consumer, granting that there is no such thing as over-production, but that there is such a thing as under-consumption.

On such a theory overheads such as depreciation would be prorated to units of products on the basis of total plant capacity and the difference resulting from a production of less than 100% capacity charged to the selling department or executive department, representing failure to market. On such a plan unit costs based upon production capacity would be relatively smaller than costs based upon output, but the total reserves in dollars would not be reduced if this low cost policy resulted in a greater number of units sold.

When we get into the economics of cost finding we find ourselves in a merry-go-round of theories, looking for the golden ring representing a cost free ride.

Manufacturers and traders will always seek to get the best possible price for their product, dependent upon what the traffic will bear, the resultant profit being a return to capital and a return of capital.

We accountants think too much of rules and entries and figures; we accept too much of practice or theory that is handed down to us in training and by our superiors. We do too little thinking for ourselves to determine policies in an original and sound way. We are hide-bound by tradition and precedent. Accounting has not kept up with business development—the development that tears down and builds up and changes facilities, all for the nation's future profit. Such things the accountant would call a loss and charge the dollars involved against a current period.

Sound accounting and sound economics must go hand in hand. We should all be thoroughly equipped to master this subject if the subject is one that will allow itself to be mastered.

Relation Between Sales Promotion and Accounting

By

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

There is undoubted value, at times, in seeing ourselves through the eyes of others. Things look yellow or blue or green to the man who looks through glass of that color and many mistakes in judgment are made because he does not know that the color is in the glass. So every individual needs periodically to see himself through others' glasses; his own may be too rosy, too dark, or too red according to individual characteristics. The present paper presents a picture of what the accountant ought to be as seen through the eyes of a sales promotion man and the author is a good salesman. He knows the problems of distribution both in theory and practice, and appreciates the economic consequences of present distributive methods. His appeal to the accountant to know selling costs is being heeded in many places today and more intelligent sales effort is the result.

Mr. Homer J. Buckley, the author, secured his education mostly in the school of experience. After a grammar school education, he went into business, getting a valuable early training, under H. G. Selfridge, then of Marshall Field & Co. now of Selfridge's, London. Mr. Buckley is considered a pioneer and trail blazer in the direct-by-mail advertising field. He is president of Buckley, Dement & Company, direct mail specialists, Chicago, employing 300 people, occupying their own six-story building, and well known as the largest letter shop in the world.

He is a member of many professional organizations many of which he has served in an official capacity. Among these may be mentioned, the Direct Mail Advertising Association International; the National Council of Business Mail Users; Advertising Club of Chicago and the Associated Advertising Clubs.

He is the author of a book entitled "Science of Marketing by Mail."

This paper was presented before the September, 1927, meeting of our Chicago Chapter.

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RELATION BETWEEN SALES PROMOTION AND ACCOUNTING

ACCOUNTING with me has been a hobby. I have been frequently asked by young men, and by fathers of young men who sought to enter the field of advertising, to give them what in my opinion would be the qualifications for a young man entering advertising work. I have startled a number of fathers by enumerating four outstanding qualifications for a young man looking forward to a successful career in advertising or in sales management work.

1. He should have a knowledge of cost accounting and finance.
2. He should have a knowledge of marketing and merchandising. By "marketing and merchandising" I mean a knowledge of mark-up and turn-over, the relation of sales to costs, and a complete understanding of marketing channels in a restricted and intensified field.
3. He should understand the mechanics of advertising and sales.
4. He should understand how to write good copy or know what constitutes good copy.

Now you will observe that I put first that he should have a knowledge of costs, accounting, and financing. I say to you gentlemen with all sincerity that the advertising and sales manager of the future will have to base his career on a much broader foundation than has been necessary in the past. And the future means from this day on, because we are in a period of intensive selling the like of which very few men in this room have ever encountered before. Most of you men have lived to see the old order of things change. You have seen the time, in 1919, 1920, and 1921, when the American business man was selling in cold blood and buying with enthusiasm. We have seen that thing change completely and we have gone back into the market, where merchants are buying in cold blood. What we need today is a complete and comprehensive understanding as to how to sell merchandise on a scientific basis and sell it with enthusiasm.

Mr. Edward N. Hurley, when he was chairman of the Federal Trade Commission, made a remarkable statement at one time that

sunk into me pretty deep, and I have found it to be absolutely true in my check-up in business. He said 50% of American business men would do better by shaking dice; they do not know their costs. That sounds like a rather facetious statement, and to a man in a large business it is a facetious statement, but let me call this to your attention. In the United States we have 250,000 corporations and less than 20% are making more than 6% on their investment. This is a startling thing. Yet it is true. You men are indentified very largely with the 20%—the larger type of corporations, with ratings beginning at $200,000 and going up into millions. But if you study the statistical readings of the more than 75% below $200,000—they are down in the $10,000, $20,000, $50,000, $75,000 and $100,000 classes—they do not have cost accountants. Vey few of them have auditors. Very few of them employ the services of an outside auditing firm even to audit the books, and frequently those concerns are not big enough to employ an advertising manager, and not altogether infrequently not even a sales manager. Sales are handled in the business very largely by some executive. He may be the secretary of the company, also interested in traffic, and he looks after a dozen and one things in the business; he is a "Jack of all trades."

We are in a period of high costs of selling, and I see an opportunity for the cost accountant and the auditor to do a job he never did before. Sales promotion men and sales managers need figures with understanding; they need figures analyzed that mean something. What do I mean by that? Let me give you a concrete case. Several years ago I was called upon by the National School Supply Jobbers' Association to deliver an address for them at the Auditorium Hotel and my subject was the fundamentals of mail order business. After my talk a gentleman followed me out of the meeting room and said "Mr. Buckley, I have been very much impressed with some of your remarks this evening. We have a very interesting school supply business in a town in northern Wisconsin. We travel about twelve salesmen, making northwestern states. We find it difficult to go into the smaller town to get business, and we rather systematically and promiscuously circulate a catalog among the small town schools and institutions to get business direct by

mail." "But," he said, "I am convinced from what you told us in this talk that we could do a much better job by creating a real mail order department. I would like to know if it would be possible for you to come up to our town and help us install a mail order department to do the kind of job referred to this afternoon."

I told him it would cost him $100 a day and expenses. I thought I had him floored, but to my surprise he said, "When can you come?" We arranged the appointment and I found myself on the way up there on a cold winter morning with snow about three inches deep, to a town about sixty miles this side of Minneapolis. I found they operated a retail store on the main floor. They had a 3-story building with about a 75-foot frontage, and the two upper floors devoted to a wholesale jobbing business. After going through the preliminaries of formal introduction to the different heads of departments, the sales manager and officers, the president invited me into a room and we sat down to discuss the mail order department, and the first thing I asked for after he said, "Mr. Buckley, the floor is yours—tell me what you want," were his sales records. He brought on his sales records, and I found he had a daily record of sales, a weekly record of sales, a monthly record of sales, a quarterly record of sales, a semi-annual record of sales, and a yearly record of sales. I said, "How many departments have you?"

"Nine."

"Let me see your department sales records."

"We don't keep our sales by departments."

"How much of a volume of business are you doing?"

"Six hundred thousand dollars."

"How much income tax did you pay last year?"

"Thirty-five thousand dollars."

I said, "That's a very healthy business."

Now when I go into a business I talk very little advertising; I talk their business. I ask a dozen to fifteen questions, all of which have to do with their business. I was very fortunate as a young man, I was associated with Marshall Field & Co., first in the advertising department and later in their merchandising department. The merchandising manager was taken rather critically ill and confined to his home for quite a long period of time. I was a

youngster in the office with him, and it fell to me to study the figures of the various departments of that store, and I used to have to visit his home at night and take out these figures. At the time I thought I was abused, but I was getting a rather practical education. Figures became a necessity with me at the time, and later proved a valuable asset, because they enabled me to apply figures to sales promotion. And that is why when this man said to me, "We don't keep our sales records by departments," or any business man says he does not keep his records on a scientific basis, I immediately asked for the financial statement.

They brought on the balance sheet. I took my pencil and went down the assets and liabilities columns, and I asked, "Don't you pay any rent here?"

"No, we own this building."

"Who does your auditing for you?"

"We have our bookkeeper pull our trial balance every month."

Some people's idea of an audit is a trial balance every month. You would be surprised, going up and down Main Street, in the business houses of America, how many people confuse a trial balance with an audit. I said, "Do you have any check-up on this?"

"Yes, across the street is the factory of the Blank Co. We have their bookkeeper come over and check our bookkeeper's figures."

"Do you have any outside help?"

"Oh no, just ourselves."

To make a long story short, I spent two days in that plant putting in a cost accounting system. At the end of the second day, I had the sales by departments for the nine departments of that business for the preceding year, and I showed them where one department of their business alone had lost $14,000 that year and they never knew it; and that same department in this catalog that they were shooting out to small town dealers of the country had taken over 30% of the catalog pages. The result was we put them on a right accounting basis. We cut out the 20% unprofitable line; we re-arranged the mark-up on some departments that were not going right. Some of the departments had a mark-up at least 30% higher than before. I put their mark-up on a basis that was sound, and then we went out with our

merchandise knowing what our costs were, knowing what our selling costs would be. We set a definite percentage of sales costs, and went out to build up department by department.

I will give you another concrete instance. I hope you will pardon the personal references, and I will make a confession to you as I go along. I have only learned this by sad experience. I have been twenty-one years in sales promotion and advertising work. About two years ago Mr. Ralph Rosenthal of Lord & Thomas called me on the telephone. "Mr. Buckley, there is a gentleman in my office who wants to do some advertising. He came up here from an Indiana town. The firm voted $15,000 for advertising and he came to Lord and Thomas."

You know there is a great advantage in having a national reputation in any business, because the green horn heads right for you, and of course Lord & Thomas get a large share. They drift into these large institutions; they drift into Ayers in Philadelphia, and Lord & Thomas in Chicago and other large agencies around the country. There was a time when they took a lot of that money, but the wise advertising agent today is not taking it. There are some yet who are taking it. He said to me over the telephone, "This man has traveled all the way up here. but we can't do anything for him."

In the course of half an hour this man came in. He was from Indianapolis and he was manufacturing industrial mops for sale to railroads, office buildings, institutions—strictly an industrial field. His market was about 35,000 very substantial prospects, and that was the whole sum of his prospects. I found he had been in business about two years. I found he had one standard unit in different sizes, and I said to him, "What does it cost you to make these mops (pointing to one)?" He looked at me in rather a surprised way and said,

"Mr. Buckley, what has that to do with advertising?"

I said,

"Just this, the relationship between your cost price and your selling price determines how long you are going to stay in business."

"Well," he said, "I have talked to a number of advertising men

and nobody has ever said anything like that to me before. About $4.85 a dozen."

"Did you say 'about?' How did you arrive at this cost?" So he attempted to tell me how he arrived at the cost, and after hearing his method I knew he did not know his costs. They had $15,000 to spend. "How did you arrive at your selling price?"

"Well," he said, "when we started in business we canvassed the competitive field thoroughly; we got the price of all competitors and we got an average price of $9.00 a dozen. We have a little patent device, and we made our cost $9.25."

And yet I have found in many concerns that prices are allowed to be made where the auditor, who knows better, sits back and allows those things to go on. I say the auditor and the cost accountant of the future must have a sales viewpoint as he never had it before. He has got to be the strong right arm of the sales department. He has got to understand the sales viewpoint to the extent that he will do more than lay down the figures. Too many cost accountants and auditors are content to bring in figures and say, "Here are your costs." They are not big enough to step out in front and help make the price, based on cost. And when the sales department in the anxiety to get orders does things that the cost accounting will not permit it to do, they ought to be big and courageous enough to say, "Gentlemen, you cannot do that," and they should be able to prove to the sales department that it is unsound and uneconomic. What is the difference between a bookkeeper and an accountant? Many of you may have heard that. The answer is this: The bookkeeper is a bookkeeper because he knows how to do it; but an accountant is an accountant because he knows why he does it. Are the accountants and auditors going to be just in the position of knowing how to do it, or are they going to be in the position of knowing why they do it? Analyze your figures, help the sales department to analyze them, give them an explanation with each cost. The average executive—sales or administrative—in any statement you bring, goes to only one place, the bottom. What is the *net?* He passes over all this mass unless you have the sales vision or the sales viewpoint sufficiently in mind to make it explanatory. Tell him what he can do and what he cannot do. The day is no longer here when you can bring in

the statements and say, "Here they are." I believe sincerely that the auditor and cost accountant who qualifies himself with the fundamental knowledge of business from the sales and administrative standpoint, and particularly from sales, has a better opportunity for going on and up to the head of that business than any other man in the business. I think he is a more valuable man in the house. The best salesman I have in my organization is a man who cannot write a piece of advertising copy. I can buy advertising copy written at $50, $75, $100 and $150 a week. I can buy the best brains in this town to write this copy at that price, but I cannot buy men who can analyze statements. When a business executive calls me in and says, "Sales are slipping. We want to do some advertising," he needs more than a copywriter; he needs somebody to analyze his business. Give me the balance sheet, and nine times out of ten I can put my finger on what is wrong. We want more cost accountants in business who can do this, who can tell what is wrong from the sales viewpoint; show the possibilities of getting orders; analyze the costs in different branches of sales; take the orders from this territory and orders from that territory, the orders for this product and for that product; show where the profit is and check it up with the sales. And when you can do that you can go ahead. Executives are hungry for that kind of information; they are begging for it and cannot get it.

To this mop manufacturer I said, after I heard his story, "Instead of spending $15,000 in advertising now, let me suggest that you take $500 or $1,000 and let us make a very thorough audit of your costs. You have a new business here, two years old; you want to put yourself on the right basis before you get in too deep." Well, he was disappointed. I could see his chin drop. He had made a special trip to Chicago to see Lord & Thomas, to place his advertising with them, and he probably had visions of the great success of Palm Olive and other things, and he thought he was going to launch right into the same thing. Here he found himself in a strange advertising office, and the man was advising him not to advertise but to spend $500 or $1,000 before he did. You can imagine yourself under such conditions. He agreed to it, but I did not know when he left my office that he was not going

to head for somebody else. Do you know what would have happened ten or twelve years ago? If that man had come into my office ten or twelve years ago and had said he had $15,000 to spend in advertising, I would have taken him into the conference room, and called in a copywriter, and arranged for a booklet, a folder or a broadside, and had his signature on the dotted line just as fast as I could have worked. That is the way I operated ten to fifteen years ago, because I only saw advertising. I was interested in copy, color, type, lay-out, photography and engraving. I was interested in snappy headlines, in coining phrases and slogans. I coined a lot of them, and they are in the graveyard; they are in the graveyard of despair and disillusion. Why? Because the slogans were bad? No, they were good slogans. Because the copy was not good? No, the copy was good. Because the art work was not good? No, the art work was excellent; I paid a high price for it. What was wrong? The structure was wrong. There were too many men starting out to advertise like the man who would start to build a house. Can you imagine a man starting out to build a $25,000 or $50,000 home, and deciding that the first man he is going to call in is the interior decorator? That is what is happening in most firms in sales promotion work. They call in artists and copywriters. I have seen big executives —mark you this—I have seen big executives spend half an hour or an hour deciding on a piece of art work for a front cover—whether the hand should be this way or that. I have been in the offices of some of the biggest executives in this country and seen them trying to decide on such a momentous question, instead of giving more attention to the fundamentals.

Well, in the case of this mop manufacturer, we sent a man down to Indianapolis. We got an auditor in town to go over with us and get some figures. We found they were occupying two floors in a loft space in a section of Indianapolis that might be comparable to Wabash Avenue and Van Buren. We found they were paying $1.50 per square foot for rental, and they had two floors, 7,000 square feet, so they were paying a high rental. That rental was about 6% higher than it should be. We found the two principals were drawing $50 a week—a very commendable thing in a business to put yourself on a low drawing account. They had no

depreciation set up for replacement of a good deal of their equipment. They had no reserve for bad accounts. We showed him his costs were $7.16 a dozen. I said to him, "If I had taken your money and trebled your business, next year you would be in bankruptcy. If I could actually treble your sales, the more business you get from now on, the deeper you are going to be in." I venture to say that more than 50% of the businesses in America, particularly in the manufacturing field, which are recorded as failing by Dun's and by Bradstreet's are failing for that reason, and because they do not have enough capital to meet the situation when sales are increasing and profits are not; not knowing their costs or not having those perfectly understood.

I have been instrumental, as a result of the teaching and practice I have been giving the last few years in having the University of Wisconsin make it obligatory upon every young man taking a course in advertising and selling in their School of Commerce to major in accountancy—not to become a C. P. A., but to have a better knowledge of it. I want more young men in the United States to study accounting—not as a vocation, I think probably both of those have been overdone as vocations, but think how much better it would be if business executives had an appreciation of the value and importance of accounting and advertising as a business matter—we would have a better understanding of things.

The first recommendation I made to this man was that he get out of his high rental place. I told him, "You are located wrong; you are hauling your raw material eight miles from the freight depot, and you are going back eight miles with your finished product. That should be absolutely wiped out. You are paying a rental all out of proportion to your type of business,"

"What do your propose?"

"How long is your lease?" He told me "n" years.

"I propose that you sell your lease. I am going to take you out of town." I had a fight on to convince him that that was the right thing to do. I wrote a letter on our firm's stationery to the Chambers of Commerce of about sixty towns within a radius of 75 miles of Indianapolis, and the letter, in substance, read something like this:

"Chamber of Commerce,
Evansville, Ind.
Gentlemen:—

We have a client doing a very satisfactory volume of business, employing about 18 people at the present time, but they have a potential possibility of bringing that up to 100 or 150 within a few years' time if the business is put in the right location. We are going to locate this factory in a small town where they will have a building, with side-track facilities. Will you please survey the situation and see what you can offer."

I had thirty invitations for this factory, and one of them was located in a little town where they could get rent for five years free if we would bring that factory in, in a building that had recently been vacated by an industry which was a branch of an eastern factory that had sustained some reverses, and they wanted to keep the building going. Nine months afterwards we were able to sell that lease, and we sold the lease for $1.85 a foot—they were paying $1.50. Instead of depending on a real estate agent we got a list of potential prospects, and we circularized this list, telling the problem straight, that we were moving the factory into a smaller community, and we sold the lease for $1.85, made a profit for him on that, took him into this town, and brought his cost down to $3.35 a dozen, and then we were ready for advertising. Advertising is an economic waste when not applied intelligently, but do you know what the greatest economic waste in business today is? It is personal selling. More money, more sales opportunities are lost by the sales staff of an organization today than can possibly ever be recorded. When the average business executive will stand up in the height of his enthusiasm for personal selling and scorn for advertising, and tell me advertising is an economic waste, I would like to check with that man, because I can prove to him that personal selling is one of the greatest economic wastes we have. Do you know that the average salesman is actually selling 4 hours out of 44 hours a week? Do you know the hours spent in going and coming, in waiting for the prospect—out today, playing golf, too busy, and a dozen and one other reasons?

Have you ever analyzed in your business what the average cost per sale or average cost per call is? Is there anything more tragic today than cold canvass? They come to my office by the score. I try to see a good many of them—I am not able to see them all. Going away—no idea of whether he is a prospect or not. I could take you over on Randolph at State and stand on the corner and show you the greatest tragedy in business in America today. I can show you a line two blocks long, trying to get into the Oriental Theatre, and over 50% are men with portfolios under their arms. That is no joke; it is serious—your salesmen and mine. That is the tragedy of it. There is where the waste is. I want to say to you we are in a period of intensive selling. No longer can we employ wasteful methods, and the cost accountant should no longer confine himself to factory production costs. That is not the problem. Factory production costs are solved. The biggest cost question that you as accountants have before you is sales costs, how to establish lower sales costs; whether it is profitable to handle this dealer's account when his business does not justify it; what should be done by your firm with this dealer who is getting a certain amount of business, and how can you increase business in profitable sales; whether it is profitable for you to continue that man in Michigan with 14% sales cost as against the man in Illinois with 7%. What does the analysis show? What are you doing to prove to your firm from the sales promotion standpoint that these costs are necessary? Those are the things today that are all important.

I say the cost accountant should enter into the sales problem of business as he has never entered into it before. He should see that a more intensified job is done. He should show his organization, his sales manager, or his chief exactly how he can accomplish certain things on a more concentrated effort, and he can only do that by qualifying himself with sales knowledge. What the advertising man must know regarding cost and finance, the auditor and accountant must know in the future regarding marketing and merchandising. If you ask me tonight, "What can I do to equip myself from the sales viewpoint?" I will say, "Read everything you can get on marketing and merchandising. Apply it to your

particular field so you will be in a better position to apply your cost and accounting knowledge to the problems of marketing and merchandising. Qualify yourself for a bigger position in your business."

My message to you is simply this: The sales promotion man, the sales manager of your business welcomes or should welcome an analysis of sales costs by territories, by men, by item, by product—in fact, give him as many details as you can, because that is the big problem in business today.

I think I could take thirty men with a sales promotion plan behind them, costing about what you are paying your forty salesmen and get twice the business the forty men are getting, because you would put an intensive plan behind them to make their work more valuable.

Results show us that 85% of orders are not placed with cold prospects. They are placed on and after the fifth call. 85% of the orders given by merchants to a new man are given on and after the fifth call! Are you going to have him do cold canvassing? Are you going to ask the salesman to go out and do missionary work? Or are you going to pave the way for him?

The biggest and most alarming problem in marketing today is the high cost of distribution and I think that can best be illustrated to you in a crude, homely story told by W. H. Ingersoll when he was addressing a convention of retail jewelers in St. Louis which I happened to be attending. He said: "An Indiana woman was peeling potatoes in her kitchen one evening and she cut into the hollow of a potato and found a note from the farmer who grew the potato—'How much did you pay for these potatoes?'" Out of curiosity, and amused at such an unusual experience, she wrote to the farmer, "I paid $4 a bushel for the potatoes. Why do you ask?"

The farmer replied, "I got 68 cents a bushel for these on my farm. It could not cost more than 32 cents to transport them to you. Who the devil got the $3?" My friends, distribution got the $3 and that woman felt she paid too much for distribution and not enough for potatoes, and she could not eat distribution. The farmer feels he is not getting his just and logical share. He is not getting enough for what he is producing and he is compelled to

pay too much for the necessities he buys. You have got to find some way of cutting down the cost of distribution and a large part of that cost is for the sale and resale entering into it. We have to study that problem. There is where the cost accountant is going to exert his efforts—not in the factory, on the unit production per machine and all that. He is going to give more attention to this all-important question that I have given you tonight. I say to you that the cost accountant and the auditor in any business who will take this cue, equip himself with sales knowledge, study all he can about merchandising and marketing, be prepared to analyze this from the sales viewpoint, is going to be a most valuable man. You must know what it costs to put a new customer on your books. How many men could raise hands tonight and tell me what it would cost in your business? If you knew you would go back and fire a lot of people in your complaint department. Mark you this —the average American business, outside of the mail order houses, does not know the cash value of a customer. If they did, they would employ a little better help to handle them. Do you know what is happening in your business? You can go into any one of your businesses and on the first of January and on the first of July your accounting department has a great big binder called a transfer ledger. In that transfer ledger they put the sheets with the names and addresses and records of once good accounts. What does the accounting department do with that ledger? They send it down to the shipping department and get the largest piece of paper and the largest piece of clothes line and wrap it all up. And where do they take it? They take it down stairs to the vault, there to remain for one, two, or three years. Did you ever see an auditor or a bookkeeper or a cost accountant pick up the transfer ledger and walk right straight back to the main chief's office and say, "Good morning, chief; I have a very important message for you this morning."

"What is it, Sam?"

"I have under my care the names of 500 accounts that once gave us business that are not giving it to us now. Don't you think the sales department should make a concerted effort to find out why these people have stopped? Are our prices wrong? Are our practices wrong? Is our service wrong?"

Did you ever know one who did that? Of course not, there is not any such. I say that's your job. I think the average president of any business would keel over backwards if the auditor ever came in that way and would say, "My God! where did you get the sales viewpoint?" Why is it that the ledger clerk and accountant, monthly, quarterly, semi-annually, will turn over the ledger sheet of an inactive account and never report it? Because they do not understand the cash value of a customer.

I will tell you why the customer quit buying. Take the names of 100, take the first 100 names you come to of people who bought from your house in 1925 that have not purchased in 1926 and 1927, and I will tell you why they quit. I have been through it so often I can tell you exactly why. 68% of that 100 quit because of indifference. What is indifference? The failure to tell your customers frequently that business is appreciated; indifference to little things; the discourteous letter from the credit department, saying the account is past due, and not properly handled. Here is what is going on in your business. The sales department sells a bill of goods to a customer, a dealer out in Waterloo, Iowa. He has bought a bill of goods, say, one dozen heating irons. The shipment arrives on the 20th of the month. When the dealer opens the shipment, he finds one of them is damaged, so he writes the firm a very courteous letter and says the shipment arrived O.K., but on unpacking he found one damaged or one short. He holds the bill with the correspondence in file and does not pass it for payment. That, of course, comes into the claim department. You know if there is any place in a business where they have the viewpoint of sales, it is the claim and adjusting department. This man's claim comes in and in the course of 10 or 15 days an answer may come forth. You have seen that. The cheapest help they can get in any business they employ in that department—Nellie and Mamie and Annie. The statement comes to this dealer in Waterloo, Iowa, and he pins it to the claim he has. The bill carries terms 2/10 discount or 3% by the 9th day. The collection department writes this man and says, "You have let the discount date go by." The fellow says, "That's the kind of bunch they are up there." Four or five days afterwards the salesman comes in and gets "hell." Three departments, but no coordination. The customer is sore. The col-

lection department is trying to get the money; they are concerned only with getting the money. The claim department tries to see how little they can do to make an adjustment. The salesman calls on the chap and he gets "hell." That's lovely. But, men, it is so serious. It is going on all the time. I venture you can go into your business and find the same thing taking place—lack of co-ordination and cohesion in these things. The claim department writes, "We have investigated the records of the shipping department, which show there were 12 irons in that shipment."

The mail order houses know better how to handle such a situation. They know it costs them $10 to put their customer on their books, and they are not going to let anything transpire to lose that customer. When a woman writes in to a mail order house and says, "I ordered two dozen bars of soap and there were only one dozen and eleven bars in the package," they do not write and tell her their records show there were two dozen; they merely wrap up one and send it to her. They know the value of a customer. They know 99.5% of the people of America are honest and they know they will get stung on ½%.

I say there are two departments in most businesses that have vinegar in their veins, the credit department and the claim department. Should we criticize the credit department? No, not at all, but I say no sales meeting in any business should be held without the credit man being invited in. If that sales manager and credit manager could sit down together and lock arms, in full appreciation of what it costs, the struggles and trials and tribulations to get that customer, the maneuvering and strategy to get that cusomer, the credit man would be more careful in handling that customer in the future. The credit man should be a sales counsellor and business counsellor. He should never put the screws on. If you men ever get into any position where credit is part of your job, never put the screws on a customer. There are only two reasons why a man does not pay a bill, he either has not the money or he has overlooked it.

Now I hope, gentlemen, in this rambling talk tonight I have left a suggestion so you can go back tomorrow, or next week, or next month and apply it in your business. I hope I have dropped an idea which will enable you to improve your opportunity with your

present connection. I hope I have dropped an idea or suggestion that will make your work more appreciated if you apply some of these facts in your business. If I have succeeded in doing that, my effort will have been worth while and I will feel compensated.

Public Utility Economics

By

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

The public utilities question has always been a political question and always will be because, as its name indicates, it is a public question. In solving the ever recurring phases of the question, what is desired by all good citizens is a full appreciation of both its business and political aspects in most of its ramifications. That probably is too much to expect but not to hope for. We are glad therefore to present these two papers which analyse several aspects of this important question.

Theodore J. Grayson prepared for college at Haverford School, Haverford, Pa., subsequently attended Haverford College, and thereafter the University of Pennsylvania Law School. He has the degrees of B.S. in Econ. and LL.B. He is a lawyer and also Associate Professor of Finance in the Wharton School of the University of Pennsylvania. He is also Director of the Evening and Extension Schools of the University. As a lawyer Mr. Grayson has devoted his time largely to the care of estates and the practice of corporation law, especially in connection with public utility corporations. He is a member of the American Gas Institute and also a member of the Educational Committee of the American Gas Association. He is Secretary and Treasurer of the New Jersey Public Utility Information Committee and also Treasurer of the New Jersey Public Utilities Association. He is the author of numerous articles among which are: "Some Standards of Finance for Holding Companies," "Management Problems of Holding Companies," "Public Utility Accounting," and "Public Utility Economics." In addition he is the author of "Social and Beneficial Associations in Pennsylvania" and of a forthcoming book entitled "Investment Trusts."

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These papers were presented before a recent meeting of our Philadelphia Chapter, N. A. C. A.

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May

ECONOMICS OF PUBLIC UTILITIES

By Dr. Theodore J. Grayson

THE Public Utility Industry today faces something of a crisis. Public utilities, as an industry, have passed through crises so many times that no longer does a crisis hold any particular terror for the observer of public utility operation and control. Therefore this particular crisis is not alarming. But it needs thorough understanding on the part of the people who use the service of public utilities as well as on the part of the operators of public utilities themselves.

If I may summarize the situation in a word, I would say that the public utilities of the United States are suffering today from too much prosperity. The public utilities of the United States are in the position today of having rebuilt their fortunes since the Great War, against all predictions, under great handicaps and with much difficulty. The very difficulties that they faced stirred within the minds and the souls of those true Americans who control the destinies of our great service companies those attributes of courage, of ingenuity, of invention, and of careful operation which have resulted in the present successful condition of the art.

Let me take you back a few years and compare the conditions that exist in the industry today with those that obtained during the time of the Great War. You will remember that even before we entered the struggle the rise in prices in the United States was very nearly like the Fourth of July roman candle in rapidity of ascent. Prices went sky high with great speed, and, so far as the public utilities were concerned, the cost of their raw materials rose at an alarming rate. I particularly remember that the gas companies had to pay more for coal and oil than they had ever dreamed of and their wage costs rose even more rapidly. You cost accountants have been through that period, and you know what it meant to industry as a whole.

Where the public utility industry differed from the ordinary industrial companies was in this important particular, that while in the case of the manufacturer it was perfectly possible to raise the price to the public a little bit faster than the cost of wages and raw materials rose to him, such a method was not open to the

public utility operator. Instead of that, application for higher rates had to be made on the part of the railroads, for example, to the Interstate Commerce Commission, and on the part of the other utilities application for increase in rates had to be made to the Public Service Boards or Public Utility Commissions in a great number of states.

It should be remembered that when those applications were made during the war period, these bodies had not been educated by experience or by training to look favorably upon demands for increase in rates. In fact, at that time their education was all the other way, and they received such applications with considerable hesitation and doubt. They conferred about them endlessly, considered them for months at a time in many cases, and finally gave, in the generality of instances, insufficient approval.

So you will find, as a result of the war period, that the utilities of the United States came out of the struggle in a very doubtful condition. I remember the necessities of that trying, critical time. I remember very well indeed, how, in order to raise money for a small utility with which I was intimately acquainted it was absolutely necessary for the officers and members of the Board of Directors to sign their names on the back of the company's paper. Today when I hear the investment bankers who attend our conventions rise and say to us, "You have us to thank, dear friends, for your present hopeful state; we came to your assistance; we did the yeoman's work in those trying times"; and when I hear that remark repeated with even more enthusiasm by the commercial bankers who may happen to be present, I think to myself, "Do they remember how in those days of stress they used to say, with that pleasant smile which always characterizes the banker, no matter what his feelings may be, that they were glad to take the company's paper, *if properly endorsed.*"

So, having finally emerged from this period of doubt, trial, and personal endorsement, we came into the reconstruction period of the post-war era, and then the utilities of the country were met by a situation which I assert they have wonderfully conquered. They were met by a tremendous demand which arose immediately after the Armistice for an increase in all kinds of service. Remember that for a period of some four or five years everything had been at a standstill; no building worthy of the name had been

done; production had ceased, except that production necessary to continue the lives of the people on a restricted basis and the production required by the exigencies of war; and then with that reversal of form, that nervous, energetic dash for further conquests in the fields of peace which characterizes our countrymen, the United States turned its face away from the struggle with Germany, turned its face away from the memories of blood and horror, and decided to exert the same energy in pushing forward the standards of America in the fields of industrial warfare. There was an instantaneous demand for all kinds of additions and extensions to the equipment and facilities of the public utility companies of America. For instance, the greatest urge was felt by public utilities in the electric field; the demand for electric power came like a whirlwind, and it had to be met.

We all know that since the war the cost of wages has not been materially reduced. We all know that some raw materials have been reduced in price; but I do not think that any one of you accountants will deny that the general level of prices and of costs has been on an entirely new basis since those anxious days of the late war. There was no hope for the utilities along the lines of a return to the old basis of production. The economics of the question lie largely there. A situation arose that required action; there was a great nation-wide demand for extension of service; there was a call to arms, as it were, in the field of peace; but there was no going backward. There was no chance to return to the old-fashioned costs of an earlier day. The year 1914 marked more than a mere historical epoch; it marked a turning point in the economics of the world, and particularly of the United States.

The only way in which this great economic crisis could be successfully met was for the men who were the leaders in industry to bend their energies to some means to bring about economies in operation which would enable them to give better service at less cost and at reasonable rates to the millions of Americans who so earnestly asked it. Now it is the successful response to this nation-wide call which has caused the crisis that the industry faces today. It is common knowledge that in all lines of the public utility industry the work since the War has been monumental in its ingenuity and in its success. The great central power stations

of the electrical industry that cover the country furnish a degree of power transmission which was unthought of in those days of 1914. The amount of power that is generated in this land every year is colossal compared with pre-war records. Seventy-five billion kilowatts of power would have seemed impossible in those days, but now they are simply a standard which already has been passed and which points like a white finger along a long road to other great standards which in the future will be successfully left behind.

The public utility industry, more than any other with which I am acquainted, has in this last decade surmounted great obstacles and it has given to the people—the consumers and the passengers of America—the most wonderful service they have ever known, and along with that service I can assure you there has been a reasonableness in the rates charged which I do not think you will find equaled in any other branch of industry. I do not say that that reasonableness has been due to altruism. This is a regulated industry, and true regulation is just as useful to the utilities as it is to the common people; but with that regulation, both by the Interstate Commerce Commission and by the numerous State Commissions of our country, we have seen that adequate rates have been maintained all over the country for greatly increased service and remarkably better facilities.

Along with that situation has come a very natural development, and that development is something that you are going to hear viciously criticised in the halls of Congress within the next few weeks. It is a perfectly reasonable development, from the economic standpoint, and I think I can show you why.

With the rise of power as a national asset to utility operation, with the inventions that have made the transmission of power over 200 and 300 miles not merely a probability of the future but a certainty of the present, there has come an ability to tie together small and moderate-sized operating units into a series of systems with some central organization in the middle of each system, as it were, and with each subsidiary company sharing in the control and in the helpful supervision and operation of the central corporation. Such a system is known in the industry as a holding company. I regret the fact that we have the name, holding company,

coupled up with these giant corporations of the present day, because the term has behind it a somewhat malodorous history.

Some twenty-five years ago, at the turn of the century, we were wont to deal with another kind of holding company which resembled the present holding company in very little except its name. The American Tobacco Trust and the old Standard Oil Company are good examples of the holding companies of the past.

The holding companies of today do so much more than hold securities that in their defense I must speak a sincere and earnest word. True it is that every great movement has its imitators, and there are so-called holding companies in the United States which are essentially so selfish and are such poor imitations of the real holding companies we know and admire that my feeling is that the only good which may come out of some general investigation by a committee of congressmen may be the elimination of the fakir.

Speaking now, however, of the *real* holding companies—companies such as The United Gas Improvement Company of Philadelphia and the great Middle Western corporations of the Insull group—I say to you that those corporations represent a new type of corporation, a type of corporation which has for its ideal, improved service to all the citizens whose servant it happens to be, and that service is guaranteed and guarded by the principle of utility regulation which was adopted in this land as long ago as 1887, when the great Interstate Commerce Commission, now second only in importance to the United States Supreme Court, had its inception. This principle of government control is today an accepted principle of the people of the United States, and they have adopted regulative control so strongly that, personally, I do not fear any further experiments on the part of the United States Government in the line of operating business enterprises, because I believe that when the smoke has cleared away the popular demand will be so strong for continuing this already approved and adopted principle that regulation will have nothing to fear.

So, returning to this subject of holding companies, I say to you that these great corporations have given, through their inventive genius, through their energy, through their ability to overcome the difficulties and handicaps of the war period, such improved service in every way, in electricity, in gas, in water and in power

and in a combination of all these various lines of industrial service, that today the country ought to be proud and glad that it has such able citizens as the men who have made these companies powerful in the service of mankind.

The holding company of today is not only a holding company but it is a great supervisory operating unit, and the subsidiary companies of each group are heartened and helped by the splendid efforts of the central staffs of these mighty holding corporations. We find that at the present moment there are from sixteen to twenty great corporations which in large measure give utility service to the people of the United States.

We find that before these companies today there are many concrete and exciting problems. You all know, for instance, that the street railway companies are going through a critical and difficult time, something for which they are not to blame, and yet something that they have to face and dispose of in the way that the people of the country demand. You know that the increase in automotive transportation within the last ten years has been simply unprecedented; that the old franchises for street railway service in our cities have, in many instances, been swept away; and that there are two schools of thought which now dominate the utility field. One line of thought is that the electric street railway is bound to be superseded, even for the short haul, by automotive transportation. The other line of thought, and I think the more scientific one, is that co-ordination will solve the problem, and that in the near future throughout most of this country a combination of electric railway service and auto 'bus service will prevail and that that combination will also be extended to the steam railroads. I believe that the best engineering thought today is agreed that, operated as feeders, auto 'buses are unexcelled in their usefulness, but that when it comes to the long haul in the city and the suburbs where great masses of people have to be moved—as they have to be moved twice a day in our metropolitan cities—and even in the larger towns, it will be necessary to combine with auto 'buses the old tried friend of the masses, the electric railway.

I bring out this problem to show you that that is one of the questions up for solution at the present time, and that the brightest engineering minds in the industry are devoting themselves whole-

heartedly to the solution of that problem in the interest of the people.

Now take another problem—one that has been solved here in the City of Philadelphia—the combination and co-ordination of electric and gas service. Look at the change in the picture that has been brought about here in the past thirty years. Many of you are too young to remember the old days of the City gas works. I give you my word that until The United Gas Improvement Company took hold of the situation I did not know what a yellow gas light was. I remember the old blue flames of those days, and I can still recollect the odor—not one of sanctity, either—which surrounded municipal gas in this vicinity. The progress of service has been remarkable in the past twenty-five years.

Side by side with The U. G. I. came the Philadelphia Electric. Starting from small beginnings we have seen within recent years the erection of the magnificent plant of the Philadelphia Electric Co. up the Delaware River, and we have noted, within a comparatively short period, four reductions in the rates by our local company as a result of operating economies and splendid supervision by officers all of whom I think are Philadelphians. Now we see a combination of these two great corporations. I am informed by their engineers that the idea in the combination from an operating and economic point of view is so to co-ordinate the service of The U. G. I. Company and the Philadelphia Electric Company that in the off-peak hours of one the great power of that company may be used to boost the supply of service by the other and that when the great demands of the future are made we may call upon the limitless reservoir of power that is now held in check by that monumental dam at Conowingo so that the men and women and children of the future will have their wants plentifully supplied as the result of the careful, earnest work and the great forethought of the present day. Is not that something to be proud of?

I have used these local utilities as yard-sticks tonight simply to measure the general situation. I stand here earnest and unashamed to defend the tremendous triumphs of a group of operating financiers and managers who have succeeded since the terrible, trying days of the late war in rendering great service to the people of the United States. Perfection, they being human, could never

hope to attain, but that their main desire, their devoted efforts and their earnest thought have been for the welfare of their country, men can never successfully deny.

Now, therefore, in these days when this industry of ours is called before the bar of public opinion we are ready to go forward to defend the things which we are proud to have had a part in doing, and I ask from you, as I would as a lawyer ask from any jury, that you will consider and weigh the evidence; and when the evidence is in and due consideration has been given to it, you will return a proper verdict, which in this case will not be merely "not guilty" but a new verdict, and the name of that verdict will be "Success."

PUBLIC RELATIONS

By Mr. Philip H. Gadsden

THEY say that one of the characteristics of the American people is their insatiable capacity to listen to public speaking, and in view of the very generous reception which you have accorded me after listening to the splendid address of Dr. Grayson, I am quite prepared to believe it. While I have done more or less speaking during my life, I never get in the presence of a lot of accountants without feeling a certain amount of embarrassment and restraint, because their mental processes and their methods of doing business are so foreign to anything that I am accustomed to. The accountant has a passion for exact figures. He wants a definite mathematical answer to all of his problems. He feels that every entry of one side of the ledger must have an offset entry on the other. He shudders at the word, approximation. It has to be exact. All that is foreign to my way of living and method of doing business. Raised as a lawyer, I always felt that when making an argument to a jury if I could get seven votes out of the twelve I was entirely satisfied that I would get a verdict. As far as arguing a case before the Supreme Court was concerned, I felt that if I got five of them on my side I had won the case. So when it comes to talking to a body of men who spend their lives seeking mathematically exact answers to all their problems I wonder what they are going to think of the approximations which I am going to talk to you about tonight.

I am supposed to talk to you tonight on the subject of public relations. Dr. Grayson has talked to you about the economics of the questions which relate to the material side of the public utility. I want for a few moments to talk to you about the human side of public relations. When that word is mentioned as a rule you think of the relations between the company and its customer, or between the company and the city council. But I want to direct your attention to a much broader phase of the problem than that. The basis of success of any public utility rests, in the last analysis, upon the theories and philosophy of your government, and it is that point to which I want to address myself for a few moments.

The theory of this government as framed by those who participated in the Declaration of Independence was that in this country of ours a government should be established based upon the encouragement of individual initiative and private enterprise and upon that foundation has been constructed this wonderful civilization which we now enjoy.

Two hundred years ago when the Puritan, the Cavalier, the Jew, and the Quaker fled to this country, what were they fleeing from, and what did they seek to find in this new country of ours? Today we have a million people coming from the old world to this, and there are millions more who would come but for our restrictions on immigration. I heard the Consul General in New York say on one occasion that in his judgment there were twenty millions of people in Europe who would come here if allowed to come. What are those people seeking to find in this country? And what are they seeking to escape in the old? The answer is exactly the same in both cases. They are fleeing from a highly centralized form of government, a government whose philosophy is to do everything for its citizens instead of allowing them to do things for themselves. They came originally two hundred years ago and they are coming now by the millions to this country in the hope of finding here an opportunity to develop their own initiative and their own enterprise.

Now in those two hundred years there has been a change coming over the government of this country. While the situation in Europe has only been intensified by the passage of years, the situation in America has radically and insidiously changed. We find the Government of the United States gradually entering into one

form of business after another. Senator Borah made a speech the other day in which he said that this Government of ours—this people of ours—was being overrun by bureaus. As a matter of statistics, one man out of twelve in this country is now an office holder. The bureaus at Washington are undertaking to advise the American people upon all manner of things, with which according to our philosophy of government they have nothing to do whatever. For instance, there is a bureau in Washington which has issued a bulletin, and taken great pride in it, giving advice to the mothers of America how to feed their babies. There is another bureau which has issued a bulletin to teach the farmers of the United States how to feed their cattle and how to pick a chicken. There is another bureau which has issued a lot of advice to the merchants of this country on how to dress their windows.

I do not propose to say that all of the acts of government are characterized by such extreme measures as this, but it indicates how far this thing can go. This invasion of the rights of business in this country has not come about through any particular group; it is as much the fault of the business man of America as it is of the politician. Whenever some social wrong or some such situation arises which seems to call for prompt action, we find one group of business men after another in America going to Washington and insisting that something must be done by Congress. If the price of wheat in the Northwest is too low, we have an insistent demand that Congress shall do something about it.

Some few years ago when there was a strike in the anthracite fields and the people of New England were threatened with a cold winter, there was a demand from New England that the Government should interfere and do something about it. At this very moment there is a conference going on, called by the Secretary of Labor, to find out what the Government can do to settle the bituminous coal troubles. There is nothing wrong with the bituminous situation except that there are too many mines in operation. There are a lot of men out on a strike but every one of their places has been taken by somebody else. But the Government is giving its sanction to that situation with a view to trying to find out what the Government can do to settle a situation which ought to be allowed to work out its own solution by the operation of economic law.

Some months ago we read in the papers that owing to the production in the petroleum fields and the inability of the men who owned these fields to get together they wanted the Government to regulate the number of wells that could be sunk. And so it goes. Whenever any particular group is suffering from some depression and gets restive from the delays of economic laws, the members of that group go to Washington. Let Washington do it!

And so it is that we are facing a situation, almost unconsciously, in which the faundamental principles of this government are being sapped and undermined. Everyone of these steps is on the road to socialism. We call it "centralized government" in this country. Abroad they are much more frank and honest with themselves than we are. They call it socialism.

Under that situation it is not surprising to find that there is a movement going on in this country today to put the government in the public utility field—not directly, of course. The issue of government ownership of public utilities and railroads was fought out in this country in the presidential election between Mr. McKinley and Mr. Bryan, and the verdict was overwhelming. But today whenever some social situation arises which seems to demand prompt action, these advocates of governmental ownership seek to foist upon that particular situation their pet hobby.

I am not criticising. In this country of ours a man has a right to advocate any theory he wants, providing he seeks to bring it about in a constitutional way. For instance, during the war the Government built a great power plant down at Muscle Shoals—a perfectly proper exercise of governmental function—to provide munitions of war. But when the war was over, under our philosophy of government that should have been sold to private enterprise. What did we do? The demand was made that that particular plant should be turned into a plant to make commercial fertilizer and the appeal was made to a section of the people of this country—the farmer—that this government undertaking be turned to this particular advantage.

We have a similar case out in the Far West. Out on the Colorado River there has been a flood situation which has, for a great many years, threatened the property in the valley through which the river flows. The Colorado River is subject to terrific floods and those in the west have been gradually building up a public

sentiment in the United States that the Government should regulate the flow of the Colorado River. It has taken fifteen or twenty years to bring that up to a point where it is recognized as a national issue and just at a time when public opinion had come to a point which would justify Congress in passing the necessary appropriation to control the flood waters of the Colorado River, this same group of people who believed that the Government should go into business seize upon this as an opportunity to put the Government into the power business, utilizing the tremendous support which had been gained for the damming of the Colorado River in order to fasten upon it the plan to put the Government in the power business.

Now what is the plan? The plan is to build a dam 500 or 600 feet high. Such a dam has never been built in the world before—never been undertaken by private enterprise—and to install a power plant with a capacity, under certain load factor conditions, of a million kilowatts. When I tell you that the total development at Niagara Falls on the American side is about 425,000 kilowatts, that the maximum development at Muscle Shoals is about 175,000 kilowatts, you can appreciate the magnitude of that enterprise. The proposition would be to put the Government into the power business on a magnificent scale.

Now that not only affects the public utility people but every citizen of the United States. It is a direct challenge to the fundamental principles upon which this Government is based. The public utility people are not opposed to the control of the flood waters of the Colorado River. As a matter of fact, as a utility, as an industry, we have not anything in the world to do with it. It is none of our business. We are no more concerned with damming the flood waters of the Colorado River than are the members of the banking group, the petroleum group, or the textile group. But, as citizens and taxpayers, while we think that the Government should take all proper methods to control the flood waters of the Colorado River as well as the Mississippi River and the rivers of New England that have recently been flooded, we do oppose utilizing that situation to put the Government into the power business. We claim that it will not only injuriously affect the public utility business itself but will still further weaken in the minds of

the people this fundamental theory of government upon which the entire prosperity of this country is built.

If the control of flood waters is a Government function—and I admit that it is—the Government should undertake that work without making it conditioned upon getting its money back. The proposition that this great Government of ours should enter upon the work of internal improvement, admittedly within its own functions, only on condition that it can get its money back from the people beneficially affected by it, is a novel and dangerous philosophy in our national legislation. Carried to its logical conclusion, it would mean that hereafter no great works of national improvement would be undertaken by the Federal Government unless they could be made to pay their way. Now, no such principle has been applied in the vast sums spent by the Federal Government in the improvement of our rivers.

This principle that I am talking about—this principle of initiative of individual and private enterprise—is the basis upon which the prosperity of America has been built. It is our political and business philosophy. In the business field you see a poor mechanic out there in Michigan with no advantages except his own industry and his own determination to succeed—unfettered by Government regulation—climbing the industrial ladder, rung by rung, until today Henry Ford is the industrial genius of the world. You see a poor boy in Illinois, born on a farm, with absolutely no advantages but with a passion for legal organization, studying law, going through all the difficulties and trials of a young lawyer, steadily advancing in the legal profession, until Judge Gary became the admitted head of the largest business in the United States. In the political field you see a poor boy in Vermont, also raised on a farm, with nobody to help him, no special advantages, but free to develop his own resources according to his own industry and his own ability, applying himself in the sphere of government, and step by step, rung by rung, he climbs that ladder until today Calvin Coolidge is the Chief Magistrate of the greatest nation on earth.

What does that mean? Why, it means that the individual initiative and private enterprise which our forefathers put into the Declaration of Independence and the Constitution is the very basis of this Government and of this civilization of ours. It is the foun-

dation upon which it is built, upon which the prosperity of America has been reared. And every time that an effort is made, for whatever cause, to put the Government into some field of American business, you are throttling and discouraging that individual initiative; you are sapping and undermining the very basis of our prosperity.

I say to you young men here tonight, if you want to keep open wide the gates of opportunity in this country to be entered on the basis of your own ability, your own industry, and your own moral courage, if you want to hand down to your children and your children's children this priceless heritage which has been bequeathed to you by your forefathers, be vigilant to resist any and every effort to undermine and sap the basis of American prosperity by Federal or State legislation.

Unintentional Falsification of Accounts

By

ERNEST F. DuBRUL

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

One of the serious deficiencies of a single unit of exchange is that, in measuring all financial and operating data by that one measuring stick, we too often lose sight of the fact that our measuring stick is not a good standard. True, the 1928 dollar contains one hundred cents just as did the 1913 dollar or the 1800 dollar, but those one hundred 1928 cents do not give us the same command over the necessities of life which an equal number of 1913 cents did. In a period of changing price levels, the value of the dollar itself is unstable—even its instability may be the chief cause of the changing price levels of other commodities. To be able properly to evaluate the various factors causing a given price trend is a rare gift, requiring for its exercise a broad knowledge of fact, the ability to estimate necessary data not yet available, and a keen appreciation of the basic economic factors of the situation.

The author, Mr. Ernest F. DuBrul, in this study illustrates a method of attack for the proper interpretation of financial data by means of a consideration of price indices and shows some of the conclusions which may be drawn from a study of this kind. He writes from an experience as a manufacturer and an association executive. This in turn was built upon an education which specialized on economics. He has been general manager of the National Machine Tool Builders' Association since 1920. For two years (1902-4) he was commissioner of the National Metal Trades Association. His manufacturing experience includes some twenty years as secretary, then vice-president and finally, until 1919, president of the Miller, DuBrul & Peters Mfg. Co., manufacturer of cigar and cigarette machines, and since 1909 president of the Pyro Clay Products Co., Oak Hill, Ohio. He has been notably active in business and civic affairs of Cincinnati, where he was born and where he has since resided substantially without interruption, and he is a national figure in economic, statistical, trade and engineering association meetings. His articles have been published by all the leading business publications.

This paper was presented at a recent meeting of the Cincinnati Chapter of the National Association of Cost Accountants.

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UNINTENTIONAL FALSIFICATION OF ACCOUNTS

IT MAY seem curious to talk to accountants about unintentional falsification of accounts. Most accountants would say that only a very poor accountant would be given to unintentional falsification. But the fact is that from the economist's point of view few accountants are free from a very grave unintentional falsification of their accounts. I think you will agree that it is the job of the progressive accountant to give the executive facts and to persuade the executive to put actual facts to profitable use.

But very few accountants' books show certain very real facts, and when they do, it is generally mere "happenstance," and it is consciously done only in very, very few cases.

Even after the accountants realize that this condition exists, it will continue in many cases because many executives will not permit their accountants to keep records that will disclose actual facts. There will always be executives and directors of business enterprises who will not wish to go to the comparatively slight trouble involved in showing facts. These men will be quite satisfied to go on with their present methods in a complacent belief that the falsification is not material. Then there will be many executives who will not wish the true condition of their company affairs to be disclosed either to their creditors or to their own stockholders.

How then, does this falsification come in if so few people realize its existence? It comes in because accounts deal only with dollars and these are not translated into purchasing power. The dollar is sacred in the eyes of most people. They think that once a dollar entry is made on a set of books, somehow or other that dollar entry represents the same value all the time. But students of economic facts are recognizing, with greater clarity each year, that our dollar mark merely stands for one twentieth of an ounce of gold. Physically the dollar is purely a quantity of gold. In accounting that dollar is used as a measure of value of other commodities.

We know that prices of different things change. We know that at times there is a marked general change of trend in the price levels of all commodities. While these changes are not uniform among all commodities, price indexes are constructed to measure

the relative change in the general purchasing power of the gold dollar.

Chart No. 1, page 1037, shows the price index used and calculated by the Federal Reserve Bank of New York, using prices of the year 1913 as the base or 100%. This chart begins at 1902 when the average price level was somewhere about 83% of 1913. The figures of this study end with the year 1925, when the general level was about 160% of 1913 prices.

The lower line on Chart No. 1 shows the relative prices of commodities in dollars, while the upper line shows the relative purchasing power of a dollar in commodities. You will notice that this is precisely the reverse of the lower line that represents price levels. In other words, it is the reciprocal of the price level.

The accounts of the vast majority of business houses never reflect this change in the purchasing power of the dollar, which really makes a big difference in the concern's actual net worth. Ordinarily price changes do not make much difference in the book values representing current assets. The current assets of a business flow in and out in a relatively short time. If the price level does not change much during that flow, there is not much change in the purchasing power invested in current assets.

But even in current assets, the price level may rise a great deal in one year, as was the case in the years 1916 and 1917 and to a lesser degree in the years 1918, 1919 and 1920 as shown on the chart. This change does make a marked difference in the value of the current assets held through a rise.

In those years many a cost account was falsified by this rapid change in price level. Goods bought at low prices were accurately entered on the cost sheets at the cost of acquisition. Then many executives deluded themselves into the belief that they were wonderful money makers because these goods were sold at much higher prices.

In those hectic days, many an executive fooled himself into believing that he was making money for his concern when he was actually creating a loss. He charged material to his production at the cost of acquisition and, although values had increased, his price did not reflect the increase. Then he bought another lot of material at a higher price, but found that for quite a while after that purchase he was making sales that did not show a good margin of

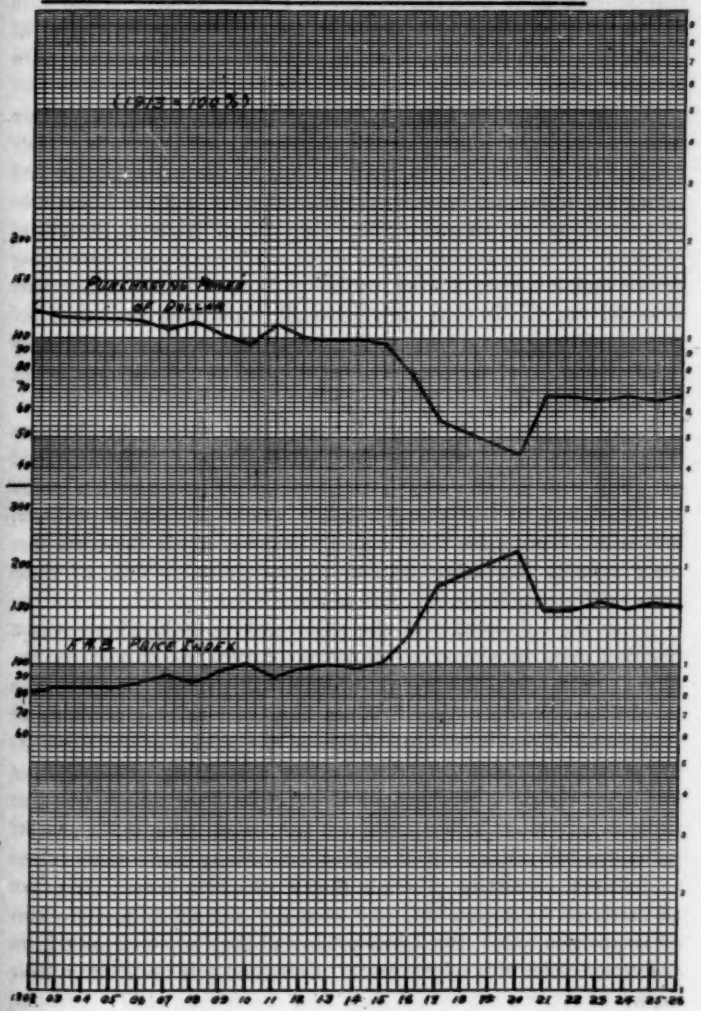
PRICE INDEX & PURCHASING POWER
PURCHASING POWER OF DOLLAR
A.N.A.C.A. PRICE INDEX

CHART NO. 1

profit at competitive prices. This was because some of his competitors had more material bought at the low prices. Then they also made prices in conformity with their cost sheet instead of in conformity with the current value of the material that they were actually using.

During this period a few of the wiser accountants insisted on using a simple accounting device that would tell the truth. They insisted on charging the material to cost at the market price and taking the difference between the market price and the lower cost of acquisition into an account that they called "Gain on Purchased Material" or some similar name. That was a very good accounting device and it served a very useful purpose. Those accountants who did not use it were unintentionally falsifying their cost accounts. That gain on purchased material was not due to efficiency in production, and the shop was not entitled to the slightest credit accruing from it.

Many an executive thought himself very shrewd in charging higher prices for his own product whenever he thought he could get away with it. In many cases he raised his prices with a qualm of conscience, in fear that somebody would call him a profiteer, and still did not raise them enough to cover all of the costs that were actually increasing without his recognition. One of these costs, and a very large one, was taxes.

After the culmination of the price peak in 1920, there was a decided drop in prices of all kinds in 1921, as shown on the chart. The drop during that year was greater than the rise in any one previous year. What happened to cost accounts at that time? Some executives followed the advice of the accounting profession based on "conservative accounting reasons"—but not based on any logical economic principle. That advice was that inventories should be written down to market value if the market value was lower than cost of acquisition. Many accountants refuse to follow a consistent principle that works both ways. If prices of materials have gone up, they want the cost sheets to show cost of acquisition only. But when prices fall they hop over on the replacement value side of the fence. Consistency is no jewel in their crown.

Not many of them follow the same policy in regard to fixed assets, however. If a client built a plant at peak prices, the ac-

countant is not likely to recommend taking less depreciation as prices of fixed assets fall. Still less would he care to show that loss of value by writing down the plant to market value. Strict consistency demands that he show all the facts, both as to acquisition costs and actual values if these are materially different.

Many executives did not follow so-called "conservative" practice. They had spent big money for the big inventories that they had accumulated, and there were tremendous accumulations, as we all know. They had borrowed a lot of money to carry those inventories. The banker who lent them the money had made the loan based, among other elements, on the book figures of these inventories. Business was terribly bad in 1921 and many concerns suffered large cash losses in that year. In 1921 the government drew their life-blood of cash for taxes levied on the basis of 1920 paper profits. Many executives did not dare show the loss in value of their inventories, under penalty of loss of credit standing, and perhaps loss of their own jobs. For various reasons of that sort it seemed wise to a large number of executives not to be "conservative" in their accounting and they did not write down those inventories in 1921, that year of great losses and small paper profits.

Then, what happened to cost accounts? The materials were entered at the high cost of acquisition although their market value was lower. So the books continued to be falsified. But that was not unintentional falsification. It was deliberate.

The preceding comments on the effect of changing price levels of current assets apply with still greater force to fixed assets. I will illustrate this as follows. A manufacturing company in 1902 built a plant near the outskirts of a rapidly growing city. It was a good plant for its day. It did not have as much window area in the walls as modern plants of the same general character now have. The floor construction would not support the loads that factory architects have now learned it to be wise to provide for. Lumber was cheap and the building was of the mill construction type.

The city grew out in the direction of this plant. The street on which the plant was located was widened into a broad highway, and part of the cost of that highway was assessed against the abutting property. That assessment took cash out of the company's treasury. The assessment was solemnly entered as an increase in the land assets, as though the assessment made the property more valu-

able. Actually of course the property was more valuable, but the increase in value was not due to the assessment, nor even due to the widening of the street expect in some slight measure. The land value increased due to the growth of the population and the demand for land in that section of the city. These things justified and compelled the construction of this highway and the levying of the assessment.

Instead of being an increase in the value of the land, as the books showed and as the tax regulations drawn by accountants would make them show, the assessment was an actual depletion of the cash of the company and a reduction of the company's real assets by the amount of cash paid as an assessment. The company was not given any greater facilities by the construction of this highway. It had to pay for facilities that the highway was offering to other people. When it paid the assessment, it merely gave to the city some of the increased value that the growth of the city itself had created.

Now let us assume that while this appreciation was going on there was no inflation of currency or reduction of purchasing power through the changing price levels of general commodities. The city taxes are levied on the basis of the actual market value of the property taxed. That particular city being in great need of funds to support a horde of hungry politicians and to give the city some government besides, kept raising the taxes as the growth of the city raised the land values. With no change in the purchasing power of the dollar, the building values of course remained the same. The company we will suppose did charge to cost some amount for depreciation of buildings.

Assume that they had done a very good job at production, that they had not had either increase or decrease in their other costs, that their efficiency remained about the same. We will also assume that their labor and materials ran along on the same level during this period when the city was growing up very fast around them, and taxing them for the privilege of having their plant in that particular location. Finally the taxes got to be such a large proportion and cut into their profits so much that the executives said, "We can't stand this taxation. The only thing to do is to move the business out to some other location where the taxes will be less, or we

can't compete with competitors that are no more efficient than we are."

Naturally this company has not the ready money to pay for a new location and build a plant on it. Very few companies have cash or reserve liquid assets sufficiently large to do that. So they go to a Trust Company, and ask what they can do in the way of financing this move. The bank sends its appraisers out to look over the property as a basis of a loan. The owners are charmed to find that the bank will lend them two-thirds of the appreciated value of their property. They are more charmed to find that the amount the bank will lend them is quite a bit more than the property cost them originally. The land value itself without the building has increased so much, due to the growth of the city, that they can get an income over the interest on the loan by renting the property to some other business that will stand the higher tax and a higher rental. They find that the bank's loan of two-thirds of this value is enough to buy another piece of land, to build another building at the same cost as the old building, but of a more convenient design.

Very likely all during the time that this appreciation was going on, the executives and the accountants stared at the figures of their statement and talked about the diminishing rate profit they were making on the original investment. Well, it depends on what you call the investment as to whether they made a profit or not in their operations.

If by investment you mean the dollars which represented purchasing power at the time they were spent, yes, the books showed a profit. But if by investment you mean the actual value owned by the stockholders, in the land, then the business would show a more diminishing return. That was not disclosed to the stockholders because the accounts were not kept that way. The tax gatherer fully recognized that value and he took his toll out of it. The executive solemnly charged those increased taxes to cost of production, and his cost accountant insisted solemnly that that was where they had to go. His accounts showed that the cost of producing goods in that plant was increasing because of taxes. The facts were that the costs were not increasing, only his cost figures were increasing.

You will notice that in this illustration I have confined the point

to the appreciation of the property due to the growth of the city. I have assumed that the general price level all through the period was the same, both for the output of the plant and for the costs of its labor, materials, supplies and everything else except the taxes which were based on the actual market value of the property. I think any sane accountant will agree with me that those increased taxes had nothing to do with the costs of production. They were increased costs of owning that particular piece of land.

The increase of the taxes over the tax rate at the time of construction was essentially an annual deduction by the city from the annual increase in the value of the land, which value was presented to the company by the growth of the city but was not entered on the books. The increased taxes would not have been levied if the city had not grown and thereby increased the land value. Nevertheless, as the taxes were paid out in cash the accountant had to find some place to stick a counter entry for that cash. Not perceiving any better place, he falsified his cost of production accounts and deluded his executives into thinking that costs were rising.

Now let us go a little further. Let us assume that the situation was further complicated by a rise in the general price level which influenced the price of that land, along with all other commodities. In the case I have in mind, the city took its toll not only of the natural appreciation due to the growth of population, but of the additional appreciation due to the inflation of the currency and the consequent reduction in purchasing power of the dollar. Does the accountant or the executive recognize this condition? Oh, no! They pay the taxes and charge them to cost of production. Do they figure profit or loss as a percentage of the actual present value of the company's assets? No, because they still carry those items on their books at the original cost. If they were to figure net earnings or losses on the actual values, after deducting depreciation from actual values, some earnings statements would look quite sick, and some loss statements would look sicker than they do now.

Assume that a company has a plant built before the war. Assume that its book assets total $1,000,000. The average proportion of fixed assets to total assets disclosed by the corporation balance sheets filed in support of the capital stock tax of 1925, is approximately 60% of total assets. If this company's books are about average, it is easy to surmise that the true value of its fixed assets is

probably twice as much as the books show. That would bring its fixed assets really up to $1,200,000 with the current assets at about $400,000. Therefore, the total assets instead of showing as $1,000,000 ought to show around $1,600,000. The net profit, when reduced to a rate of earnings on total assets should be figured on a base of $1,600,000 instead of $1,000,000 in order to give the executives and the stockholders a true picture of the conditions.

Unless the net earnings, after taxes and true depreciation are deducted, have shown as much increase as the property has appreciated through the inflation of money, the business has really been earning less purchasing power as time goes on than when the stockholder invested a given amount of purchasing power in the business.

The inflation of currency disguises this economic fact, and often leads people to think that a business is progressing when it may be actually retrograding.

To show that this is not entirely an abstract dream, not based on facts, let us take the public records of a large corporation which is always thought of as being exceptionally well managed. It is one which publishes more statements than most other corporations do. This corporation is so large that it has a large public interest, both from the point of view of its stockholders, of society at large, and of its relative participation or share of the business of the whole industry in which it operates. The company is U. S. Steel Corporation. We will put the published records of U. S. Steel under test and take out the distortions brought about by these price level changes over which the management of U. S. Steel had no control whatever.

Chart No. 2, page 1044, shows on the upper line the relative change of the corporation's participation in the total production of steel ingots, year by year. This again has been figured back to its participation in 1913 as 100%. All the detail charts and curves shown in this study are also based on the year 1913 as 100%. The lower curve on Chart No. 2 shows the U. S. Steel production year by year, relative to its 1913 production. You will note that in spite of the fluctuation in production between 1902 and 1918, its percentage of participation shows a very smooth and practically steady declining trend. The participation curve wabbled for four years after that but again resumed its steady trend downward. In 1902,

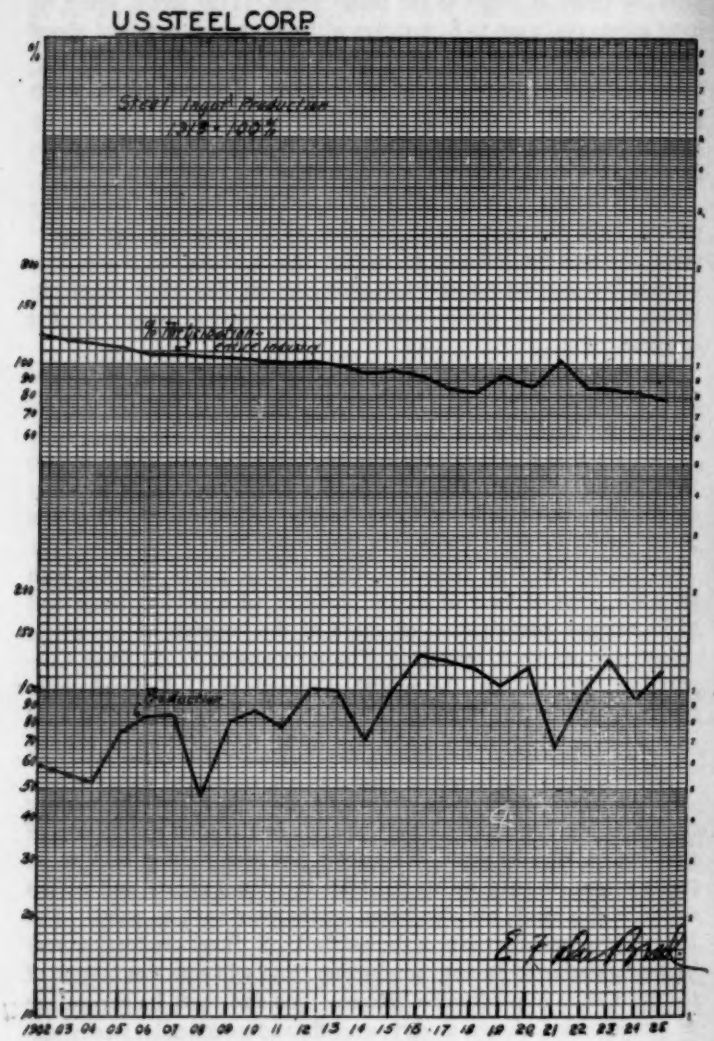
U.S. STEEL CORP.
Steel Ingot Production
1902-1924
Production
1902 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

CHART NO. 2

as shown on this curve, U. S. Steel's participation was about 120% of its 1913 participation and in 1925 its share dropped to less than 80% of the share it had in 1913. Figuring that back to 1902, its 1925 share was less than two-thirds of its 1902 share of the total production, although its actual production in 1925 was about twice as high as in 1902. In other words, relative to the whole industry, U. S. Steel has not maintained the same relative position that it had in tonnage in 1902. The total production of the industry has grown faster than U. S. Steel's production.

This leads one to wonder if perhaps other producers of steel have been making more money per ton than U. S. Steel has been making, and not only more money, but perhaps more purchasing power per ton.

Chart No. 3, page 1046, shows curves of the following items as reported each year by U. S. Steel:

Gross Receipts
General Expense
Wages
Net for Stockholders
Depreciation
Taxes

Now, let us see what the changing price level has done to all the dollar curves. This is shown on Chart No. 4, page 1047. To get these, we take each year's figure for each one of these series and divide it by the price index figure for the year. That then turns each series into deflated dollars of the same purchasing power. You will notice that all the series used in this situation are operation items and do not reflect any fixed asset accounts. Besides the dollar curves, on both charts I have placed for comparison the corporation's production in tons of steel ingots. Being a chart of physical things, it needs no deflation because a ton of steel is always a ton of steel.

In order to untangle these interweaving curves and to put them all on a common basis of comparison, I have reduced all the series both of raw dollars and of deflated dollars, to a percentage of their respective 1913 values, and I have plotted each series, both raw and deflated, on a separate sheet.

Now we will examine the results disclosed by this correction for

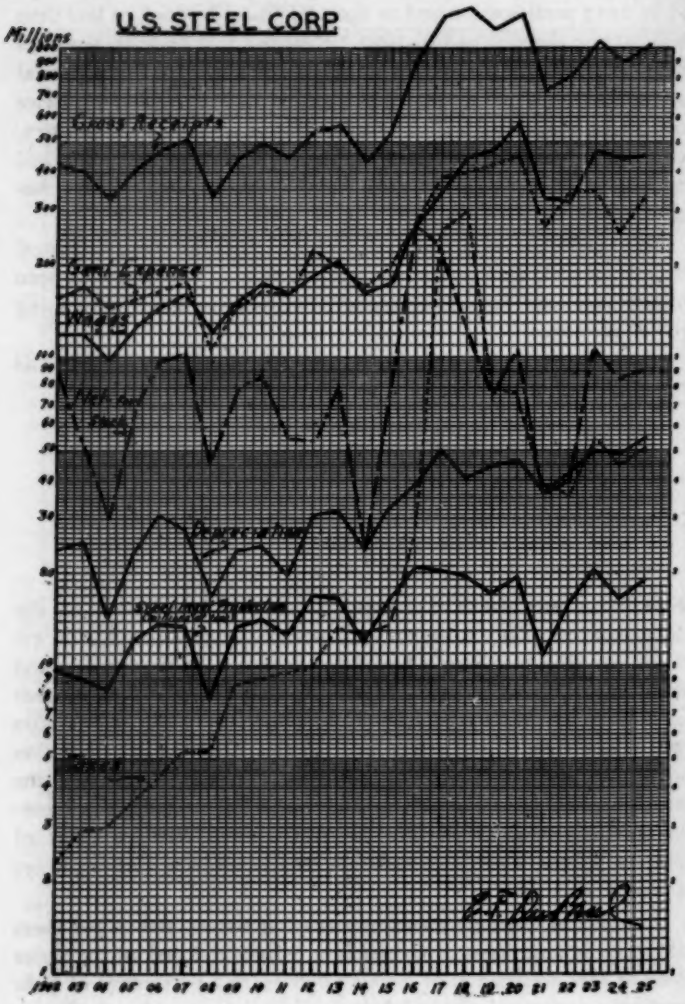
U.S. STEEL CORP.
Millions
Gross Receipts
Net Profit
Wages
Number of Employees
Taxes

CHART No. 3

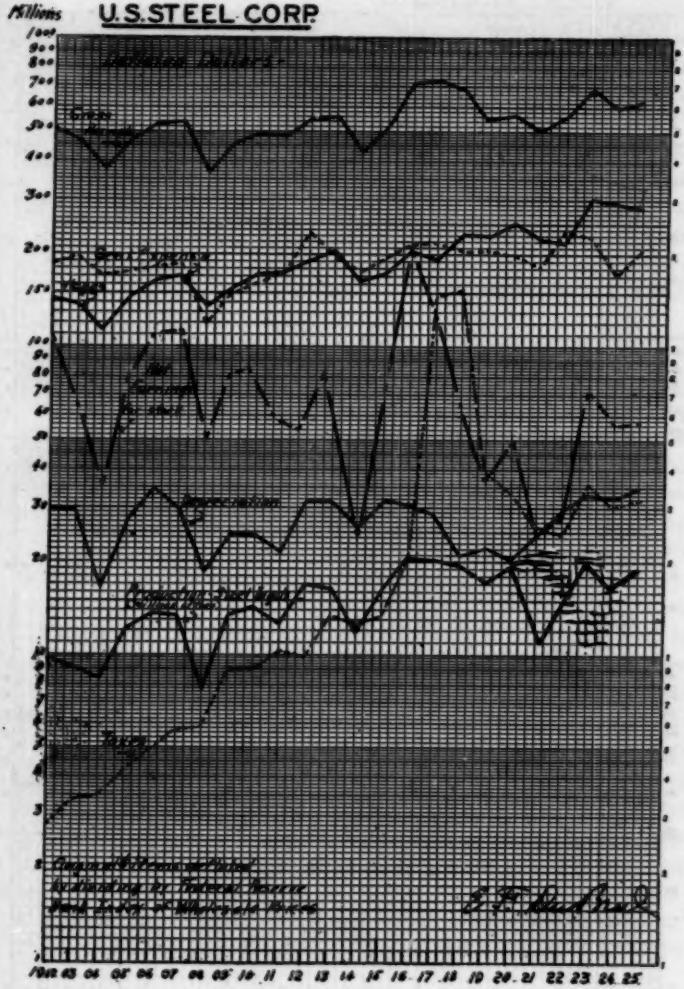

CHART NO. 4

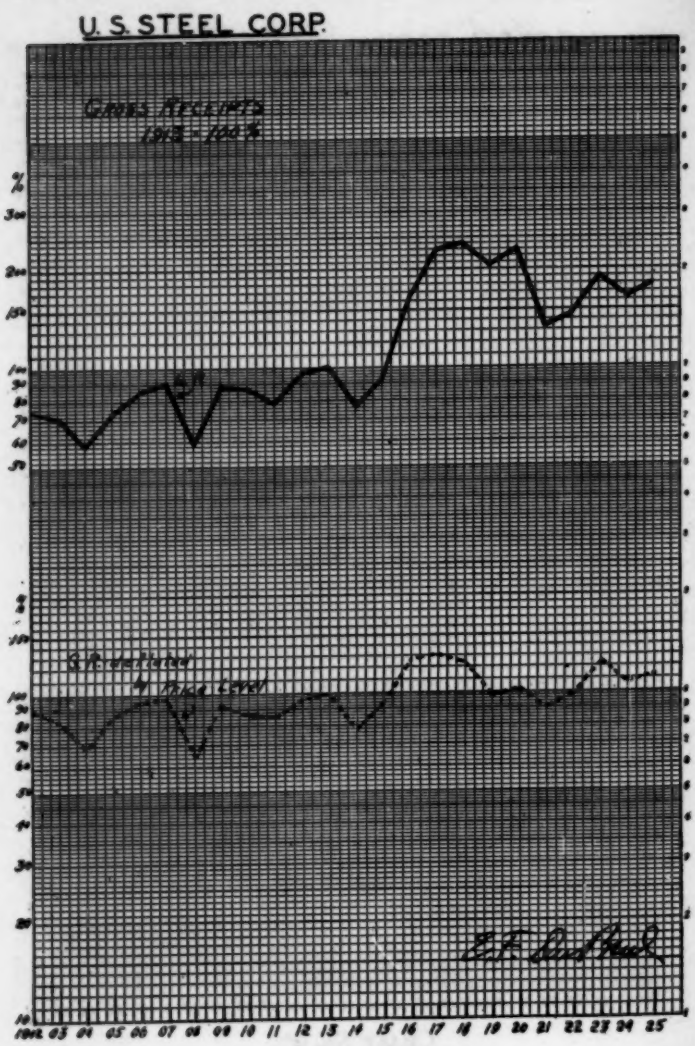
U. S. STEEL CORP.
Gross Receipts
1913 = 100 %
%
300
200
150
100
90
80
70
60
50
40
30
20
10
1902 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

CHART No. 5

the dollar delusion. Comparing Chart No. 5, page 1048, with Chart No. 2, one sees that in raw dollars the receipts have had a very much more rapid advance than the production. A trend line drawn through the receipts curve would confirm that impression. But, drawing a trend line through the deflated receipts will show that the trend of purchasing power of these gross receipts did not increase as much as the production increased. In other words, the user of steel paid less, in purchasing power, per ton of steel. That gave a social dividend to the users. That of course might be all right for the stockholder. Greater efficiency might overcome the reduced purchasing power and leave a greater purchasing power of the net earnings. But we shall see later that this was not the case.

Chart No. 6, page 1050, shows the conditions in general expense. From the raw dollars, one would think that there was a tremendous increase in the general expense. But looking at the curve of deflated expense, one observes that its trend rises very much less than the trend of production, and also less than the trend of the deflated receipts. This speaks very well for the management. It shows that the management was able to produce and sell a greatly increasing amount of steel with very little increase in the trend of general expense. That on its face should be excellent for the stockholders.

Chart No. 7, page 1051, put the depreciation account under the same test. The fluctuations in the raw dollars of depreciation show that the amount taken was evidently not calculated either on the straight line method nor on the tonnage made; but must have had some relationship to the gross receipts. It varies about like the raw gross receipts curve does for the period up to 1914. But during the war years the raw depreciation curve does not go as high as the raw gross receipts. We could conclude from this that the regulations of the income tax unit probably had some influence in changing the policy of the corporation in respect to depreciation. Perhaps from now on the line will be closer to the tonnage curve, and depreciation will now be figured by the unit of work method, regardless of gross receipts.

But that is incidental. Our main consideration at this time is to scrutinize the deflated depreciation as given on Chart No. 7. Here we see that the purchasing power actually set aside by the corpora-

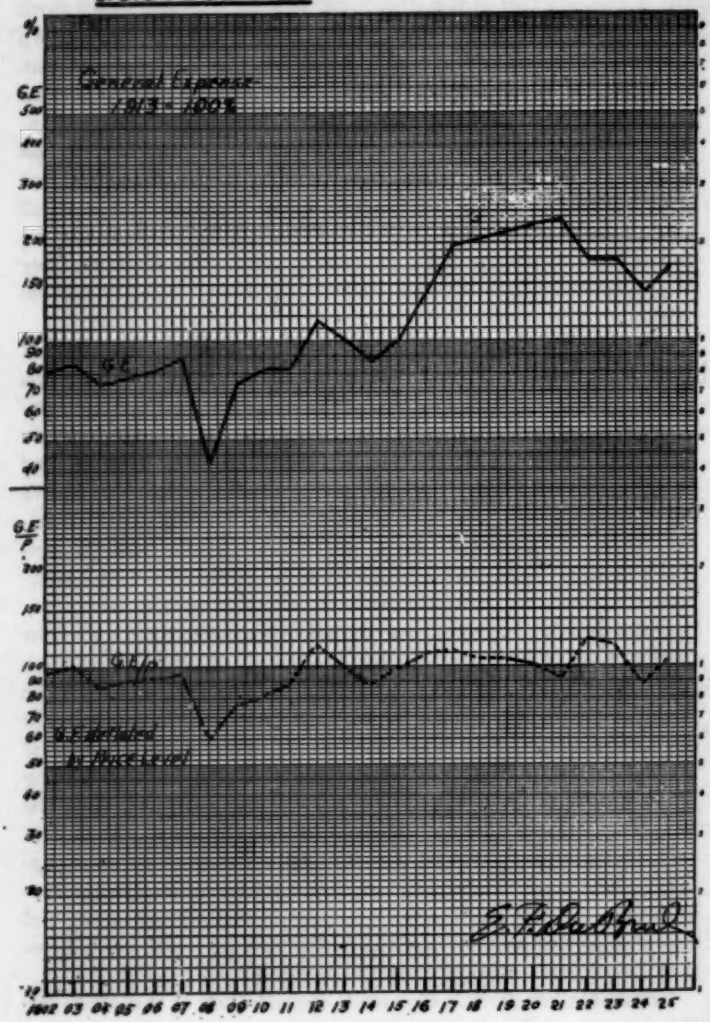
U.S. STEEL CORP
%
G.E.
General Expense
1913 = 100%
G.E.
G.E./P
U.S. Steel Corp.
Av. Price Action
1902 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

CHART No. 6

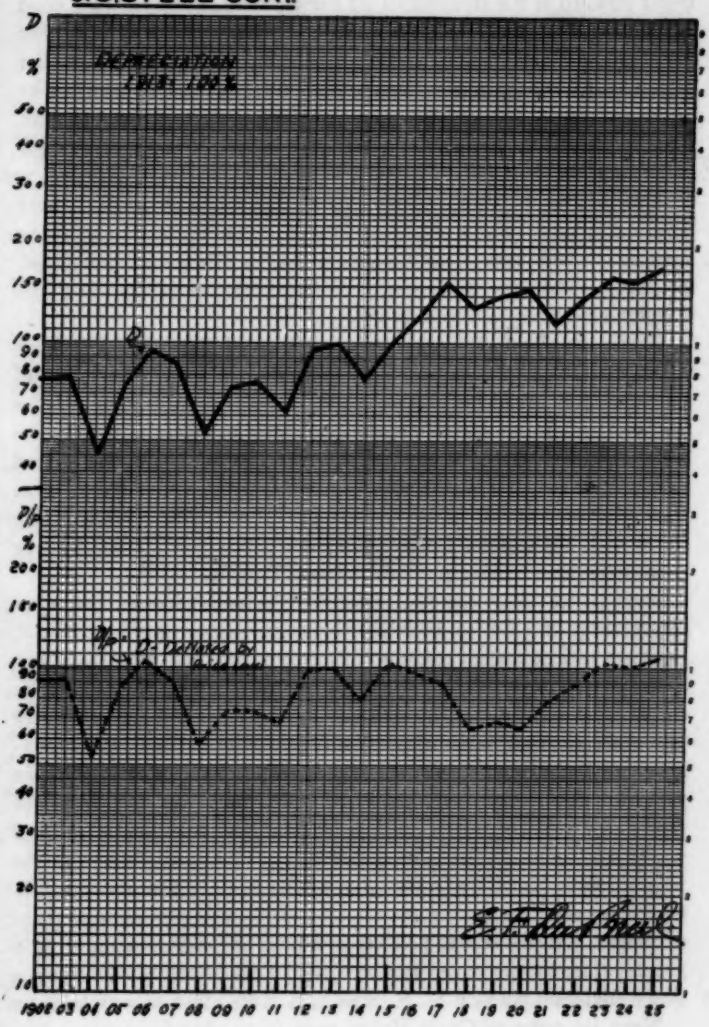
U.S.STEEL CORP
D
%
500
400
300
200
150
100
90
80
70
60
50
40
D/P
%
200
150
100
90
80
70
60
50
40
30
20
10
1902 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

CHART No. 7

tion for depreciation has a very slight upward trend. In fact, its trend upward is the smallest of all these curves. Now is that good for the stockholders? Probably not, for two reasons. Note that the tonnage produced, as shown on the production curve on Chart No. 3, was over 20 million tons a year in 1915, '16, '17 and '23, as compared to somewhat less than ten million tons a year in 1902. That means of course that the corporation has now a much larger plant capacity than it had in 1902. The corporation's reports show that to be a fact. The larger production capacity represents more physical capital in the shape of larger, more complex and more automatic machinery, larger furnaces and buildings and what not. All these assets are more costly at the same price level than the simpler machinery and plants of 1902.

From our chart alone we may fairly conclude that the lack of upward trend in the depreciation account does not reflect a good situation for the stockholders. This conclusion is backed up by the word of Judge Gary himself, speaking to stockholders' meetings on at least two occasions. He told them that the so-called surplus of the corporation was deceptive because the depreciation accounts were based on old plant values, and under present price conditions, the amounts charged off each year would not replace more than half of the very same kind of plant.

Now let us see where the other distributive shares of gross receipts come in. Let us consider wages as shown on Chart No. 8, page 1053. Looking at the raw dollar curve one sees that there was a tremendous increase in money wages paid to the employees of the corporation during the war period. This increase was due partly to large expansion in production resulting in more men on the payroll, in spite of improvements in the new plants. It was also due in part to larger wages paid per man. The total purchasing power paid to the wage earners as a class is shown in the curve of deflated wages on Chart No. 8. The figure for 1923 is about 200% of the figure for 1902. The figure of tonnage for 1923 is about 180% of the tonnage figure for 1902. Therefore, the purchasing power of wages, the real wages per ton produced in 1928 was about 25% greater than the wage per ton in 1902. This certainly represents a social dividend paid by U. S. Steel to a large class of people.

Next we come to Chart No. 9, page 1054, showing taxes. You will notice that in Charts No. 3 and 4 as well as Chart No. 9, the

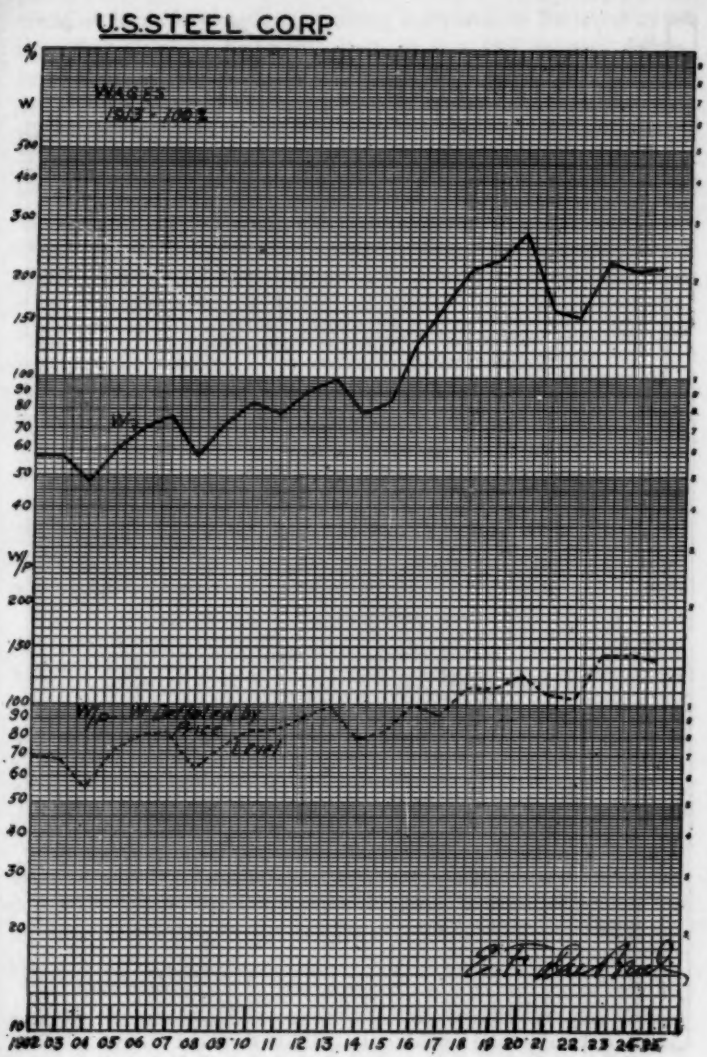
U.S. STEEL CORP.
%
W
W/p
W/o
1902 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

CHART No. 8

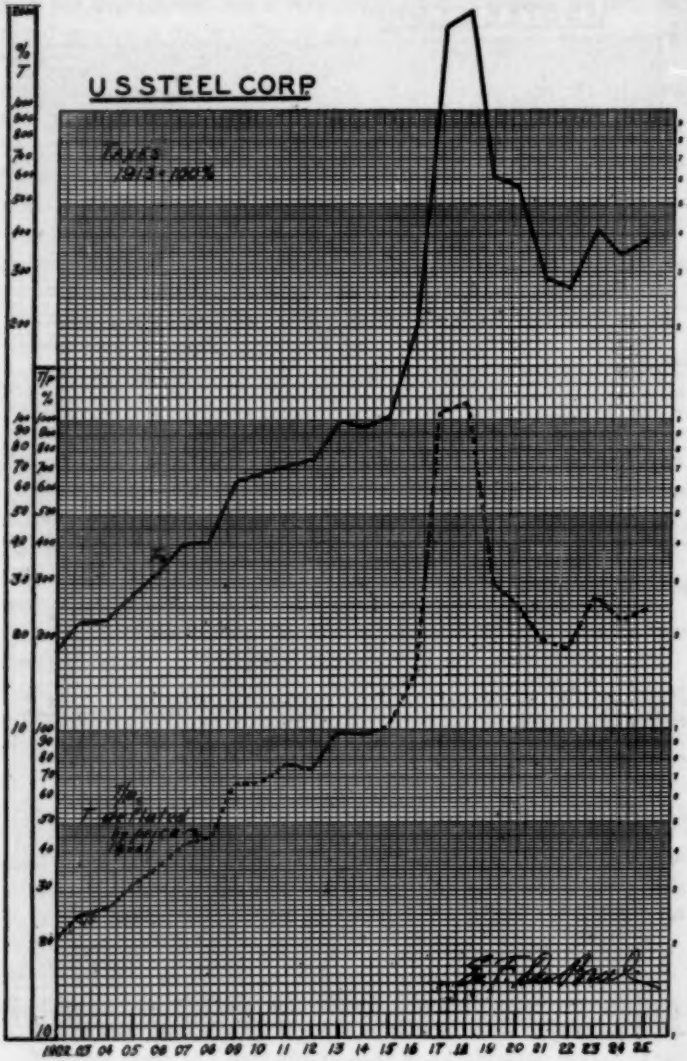
U S STEEL CORP
1902 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

CHART NO. 9

trend of taxes is something startling compared to the trend of all the other elements reported. Both in raw and deflated dollars, taxes show a trend which is extremely steep and steady, with the remarkable peak of war taxes making merely a sort of blow-out in the curve. In raw dollars the trend would measure somewhere about 2,300% increase and in deflated dollars it would measure around 1,400% increase. Compare that increase with the increase in the trend of production, which was about 180%. The present-day taxes are tremendously larger than they were at the beginning of the steel corporation's history, and seem to be compounding at the same heavy rate from year to year. Certainly the taxing bodies, federal, state, and local, have taken a very handsome and increasing social dividend out of U. S. Steel as a corporation.

Now we shall see how the social dividends in steel, in wages and in taxes have affected the stockholders. We know that the common stock got some extra purchasing power out of the bondholder. We are not going to distinguish between the preferred and common stock, although the common stockholder got some purchasing power out of the preferred stockholder. We know that depreciation was not enough to replace the plant used up, so the reported net was really larger than the actual.

On the upper curve of Chart No. 10, page 1056, even the raw dollars curve of net earnings shows a slightly declining trend from 1902 to 1914. It shows a tremendous increase in dollar earnings at the peak of 1916 in spite of the large increase in taxes that year, falling off only a little in 1917, in spite of the still larger increase in taxes. This falling off continued down to 1919 in spite of the decrease in taxes. The curve would give the appearance of being on a somewhat higher level since 1919.

But when we come to deflate this net earnings curve, we see a very different picture indeed. It shows a declining trend in the purchasing power earned for the stockholders in spite of all the increase of production and in spite of the efficiency of general expense per ton.

This showing would be still worse if we were to take off of this net for the stockholders the amount of purchasing power that ought to be transferred to and recorded in the depreciation account. To the extent that the depreciation account has been deficient, the deflated net earnings curve would decline still further.

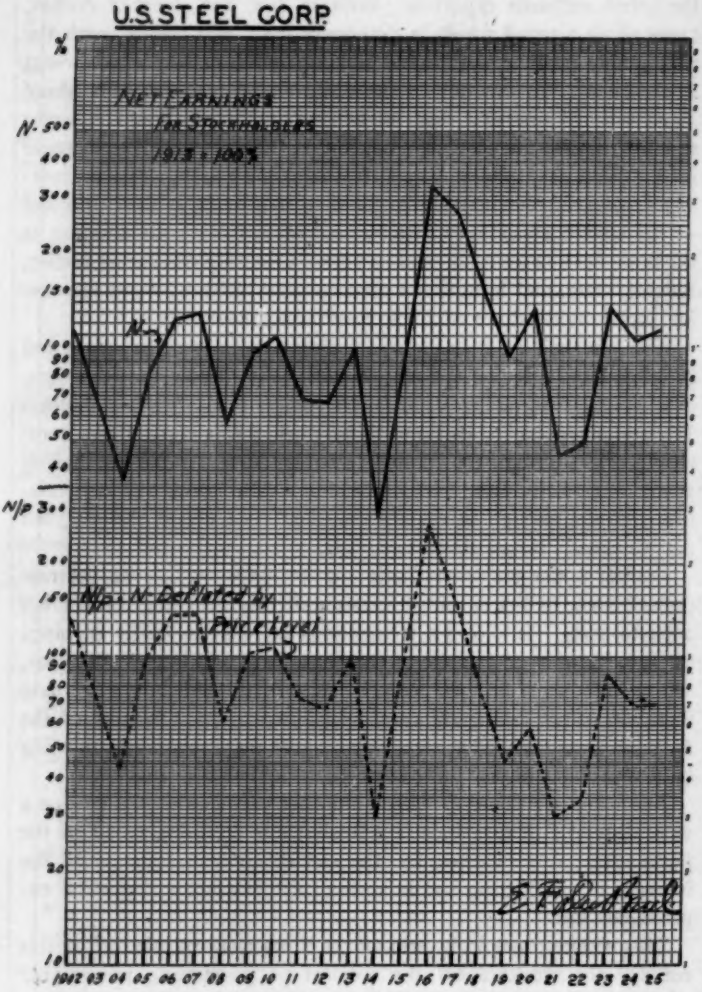
U.S. STEEL CORP.
%
N. 500
400
300
200
150
100
90
80
70
60
50
40
N/p 300
200
150
100
90
80
70
60
50
40
30
20
10
1902 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
E. Filbert Paul

CHART NO. 10

Now, all of the other curves, even depreciation and general expense show an increasing trend, the smallest increase being shown in depreciation and the largest in taxes. But the net for the stockholders shows a very marked decreasing trend in purchasing power.

Now take it from another angle, the price of the stock. Back in 1902, U. S. Steel common stock sold for very few dollars per share. The market value of the 1902 share plus the market value of the stock dividend issued not so long ago, is very much higher now than it was in 1902. The strangest delusion of all is, that in view of this actual condition of earnings which is not disclosed in the accounts of U. S. Steel unless it is put under analysis, the price of the stock should be so much higher than it was 25 years ago.

U. S. Steel is a corporation that showed some book earnings over interest in every single year of its existence. Sometimes the earnings did not leave very much for the common stock in any given year. One might reasonably suspect that more detailed analysis might disclose that some of these earnings were due entirely to book entries that took off less depreciation in those years. But taking the figures as reported, the trend of the purchasing power of the earnings is decidedly downward.

If that can be true for such a large concern, whose management has been held up as a shining example to lesser business men, how much more true it must be in the case of many a smaller business. It would be to the advantage of stockholders in U. S. Steel to get a better picture of facts than their reports have given them. Would it not be to the advantage of many a small concern in which the owner has staked a relatively large portion of his personal fortune, for his accountant to give him a much clearer analysis than is given in the report of any certified public accountant who examines and certifies to the accuracy of the book figures?

I can see a broad field for the accountant in this sort of analysis as well as in ratio analysis of which I have previously spoken to this audience. Let us assume that a keen executive is fortified with this kind of information; his own eyes are not blinded then, even though he may conceal it from the stockholders and leave them to find out these facts for themselves. Could he not guide his company's policies far more intelligently with this sort of a searchlight thrown on the course he is following than he can possibly guide it when the lens of his searchlight is full of defects that make things

appear quite different than they really are? Assume that this executive does as he should do, work in the interest of his stockholders, would he not be in better position to lay out sound policy to accord to the actual facts? Could he not thereby either make a greater success of his company or save his stockholders by closing up the business and getting them into something else that would give them and him greater reward for their efforts?

European Manufacturing Methods and Costs

By

CHAS. E. BEDAUX

The Chas. E. Bedaux Co.,

New York City

The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

As a preparation for a more active part in international commerce, a knowledge of the economic and technical organization problems of foreign industries should prove extremely valuable. The present publication deals with some phases of these problems and is the result of a first-hand study of them.

The author, Chas. E. Bedaux, was born and educated in Paris, France. Upon completion of his studies, he was attracted by the greater opportunities offered by the United States and decided to come to this country. When Mr. Bedaux arrived here some twenty-odd years ago, he was handicapped by his inability to speak English. This handicap, coupled with the fact that he wished to remain independent of aid from France, forced him to accept employment in humble capacities in various manufacturing plants. As his knowledge of English became better, he advanced in the chemical industry, where his engineering training was utilized to good advantage. It was about this time that he began formulating the "Bedaux" Principle. Having conceived it, he returned to Europe to try it out, and was working in Belgium at the outbreak of the European War. Being by this time an American citizen, he joined the French Foreign Legion and fought with that organization during the early years of the war. He was returned to this country early in 1916 and shortly after began the first "Bedaux" application. This was at the Imperial Furniture Company. Grand Rapids, Michigan. In the short space of some eleven or twelve years, he has brought his work to international recognition and applications of it are being made by the various "Bedaux" organizations in the United States, Canada, South America, England, Holland, Germany, and Italy. From immigrant to an engineer of world-wide reputation, acquired in a country whose language he did not know, is a remarkable tribute to his industry and capabilities.

This paper was presented before a recent meeting of the Rochester Chapter, N.A.C.A.

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EUROPEAN MANUFACTURING METHODS AND COSTS

SOME of you have asked me to talk to you on the Continental executive versus the American executive. This request shows that in your mind there must be a difference, and you are quite right. Another suggestion was that I should talk on the production and cost methods of the Continent in comparison with those of America, but can you compare a thing that is with a thing that is not? Perhaps if we look into the first question we will find the answer to the second.

To see the difference between the American man of business and the European, one need only look into the characteristics of each. These are affected by racial, economic, social and political conditions. To treat of the complexion of each type under the sub-headings just mentioned would make this talk a dry affair, more like a report, and, besides, would call for an analysis and consequent concentration that I would just as soon dodge. To treat adequately the subject you have assigned to me would require a study into the origin of each nationality involved and an exposition of the consequent characteristics. This would, of course, call for a volume on each nationality. The best we can do this evening is to skip over the surface of things generally, digging a little deeper only into those phases of the subject where I may have some claims to knowledge.

To me the most important characteristic of an executive is his receptivity to new ideas. You will not be surprised to see me bear down heavily on this point. Executive ability in the restricted sense of making people do what one wants them to do, I have often failed to credit in a degree others would have accorded. With a more definite and scientific control, the executive ability so often found wanting would become plentiful. It takes more than ability, it requires true genius to make men do what one wants when one does not exactly know what it is nor how it is to be done. Our country is today so far in advance of all others in its capacity to control the various phases of the manufacturing cycle that our reputation for executive ability is consequently enhanced. Industrial Europe will become a better, more capable boss when it adopts our means of control and devises its own. When considering the European executive we must consider the lack of control as a serious factor.

Going from West to East, we start with the Britisher. First we see that this executive's philosophy has long been influenced by an overcrowded people who are loath to leave their native soil. A factory manager, confronted with the need of meeting competition by reducing costs through increased production will, in all sincerity, come to the conclusion that it cannot be done, for the men cannot be let out in the cold. Wage workers in England look upon their jobs as permanent If let out, they will not know where to go because all the jobs are taken. To lay them off means taking their bread from their mouths and the roof from over their heads. No, to the British mind, the answer is to get a larger volume of business and produce it with the permanent crew. Meanwhile, the British executive waits for the bigger business, and quotes the high price which will not bring in a sufficient amount of orders. Great Britain is confronted in this instance by a combination of economic and racial conditions. John Bull is an old hand at colony exploitation, and British labor has learned long ago that all is not rosy in colonial life. As the automatic gathering of blind optimism in the face of adverse facts is not a racial characteristic of the Englishman, British labor prefers to stay home. The leaders of the country know this well. The Wembley Exposition was an effort to popularize the colonial life, but so far the results do not show it to have been productive. If a business executive proves an exception to this rule—and there are striking and courageous instances—the effort made is not always immediately rewarded. Many wage workers, rather than increase their speed prefer to keep the production low and risk dismissal as they can fall back on the dole, a government pension to the unemployed. To a certain point this political condition excuses the attitude of the manager opposed to the reduction of the number of his employees through an increased individual production.

Unlike some of his Continental friends, the British executive is not antagonistic to new ideas, though he may prefer them to be stamped with the legend, "Made in Great Britain." If they are foreign, he is likely to receive them coldly and to prepare as he listens, a brief, showing why the idea advanced does not fit rightly with British conditions. He may be convinced by solid evidence and try half-heartedly, but once he has been shown in his own plant, then you may rely on his undivided—I would go further

and say stubborn—support, for the Britisher is, before everything, a very fine sport. The casual acquaintance, the manufacturer of Great Britain will not take through his plant, because of secret methods and secret processes. This condition, in fact, applies fairly generally all over the world outside of the United States. This in no wise prevents the pirating of new ideas applied to manufacture—for there are more ways than one to skin a cat or find out what one's neighbor is doing—but it does prevent the periodical visits of the British executive to other plants, such as are so common in the United States. This is a habit which, if generally applied in Great Britain, would materially broaden the factory executive and repay many, many times the expense involved. Each British directorate should enter into agreements with other boards, arranging for an exchange of periodical visits of factory executives to industries other than their own. Bearing in mind that the Britisher is fond of his ways and can make you feel it in no unmistakable manner, the making of those visits should not be left to the discretion or option of the individual; they should be compulsory.

However that may be, the British factory head is having today a very hard time. With heavy taxes, an apathetic labor ready to fall any time on the dole, an industry disorganized profoundly by the war and the post-war reactions, the centers of international finance and foreign trade gradually shifting away from him, he faces hard sledding. Seldom cordial, often crabby, always feeling that all things not British would be a deal better if they were, he buckles down, in his own way, faces his own problem, and with teeth set sticks to his uphill job. With Somerset Maugham we may say of him that if he had manners as good as his courage, he would deserve the opinion he has of himself.

Germany is a fine ship with a fickle rudder. The old successful principles and traditions have been too recently shattered to permit to the German a clear vision of the line of conduct to follow. The German executive, who, in the past, always knew so well what to do, today has lost his bearings. He does not know just how to handle his labor in the democratic manner, and has enough common sense to know perfectly well that he cannot use the rough methods of the autocratic old-timer. He battles as best he can—with the courts of arbitration wielding the powerful

weapon of the last word in wage disputes—introduces welfare measures, inaugurates congress systems of labor representation, and, once in a while, reverting to the old days in a natural reflex, he punches a man in the eye.

I was discussing a few months ago the merits of a German factory manager. I found him aggressive, well informed, and capable. His employer, one of the big leaders of Northern German industry, did not agree with me. "No, Mr. Bedaux, Wachman iss not so good. He iss not popular, he iss too brutal. Labor she does not like him. Before the war Wachman was factory superintendent. He was brutal, he talked rough. One day he got angry at a workman and he talked rough, so rough that the workman he got so afraid and so emotional that he dropped down on the floor and died. Labor, she doesn't forget. Wachman iss not popular, he iss too brutal." I proposed another man I had noticed but I was told he was too weak, he could never handle German labor. And there you are; the old and new cannot quite do just yet. Personally, we find German labor and its executive just about ideal; disciplined, alert, curious, energetic. They instinctively like method, and consequently love us. A German executive takes to new ideas like all Germans take to sausage, and caterpillars to cabbage. He does not wait till new ideas are brought to his attention for study. No, he finds them himself. We did not go drumming our wares through Germany. We were routed out before we thought of the country as a possible field. We were given two years to prepare ourselves, and as we were slow to start we received an ultimatum, German made, stating that we had the choice to get busy now or leave the field to imitators. We got busy. The German's difficulty in coping with labor problems brought about by the new form of government should not be interpreted as a truly pessimistic note. The German executive has many other troubles, scarcity of credit, high prices of commodities due to imperfect financial readjustments, loss of prestige in foreign fields, loss of colonies, loss of merchant marine, loss of national territory. He has so many troubles that, like a planter in the tropics with mosquitoes, he no longer feels them. He waves them aside and goes to work, works hard, works long, and likes it. All his present handicaps cannot prevail against his will to be a living force and his practical work as its application.

The German welcomes new things, applies them, improves them, makes them cheaper and in time undersells the inventor. He finds this more profitable and more practical than inventing, though in certain fields he has shown himself capable of turning into that type of impractical dreamer. He prefers, however, the execution and the distribution. There he is master and he knows it. He will have an elaborate cost system if he has found one to fit his needs, a rough and ready one if he has not yet found anything better; but he generally knows his costs fairly well—well enough, at any rate, to carry on his shrewd merchandising on sure grounds.

He is not going to recover from the Great Setback, heretofore called the Great War, without making a tremendous effort; but, unlike some of his European friends, he is sure to enjoy the task of coming back; he cannot help it. It is his predominant racial characteristic to enjoy work.

There is no one more reactionary, more pessimistic, less interested than an inventor in anything not concerning his invention. Generally speaking, of course, the Frenchman of business is the typical inventor. His main invention is France. This is a distorted and impractical conception which brings him nothing but rebuffs and discouragement. He places his country on the high pinnacle of the glorious past it so justly deserves, but he thinks that all French politicians—and all Frenchmen are more or less that—are crooks who are selling the country or at any rate are incapable of bringing about the least improvement in the situation. He places the French flag so very high and the flag-bearer so very low that the flagpole is too long, too cumbersome, too heavy to bear. As the greatest war sufferer and unable for the time being to live up to a glorious past, to a matchless ideal, he hoists both higher and higher, out of reach of the profane, and throws his faltering fellow citizen into a vast pit of contempt and abuse. He places so much faith in his country that he has none left for his countrymen. Thus he offers us the composite picture of the loftiest nation and the meanest nationals— an erroneous conception, an impractical invention refusing to work and giving no joy to its inventor.

After long suffering, great anguish and great hopes, there is nothing more cruel than victory with disillusion. In the Great Setback the French did much and expected much; like the rest they

got the set-back. Each Frenchman shows his disappointment in his own way. Accusations and denunciations fly from all sides to all sides. We, of course, come in for a good share. At the bottom of it all one finds plain disappointment, a bitter flavor which spoils the taste for work, particularly when much of the work is to rebuild something that should never have been destroyed. One-half hour of business talk in France will invariably bring you onto the grounds of politics. Red politics of labor, interfering, incapable, politics of the party in power, crooked politics of the many parties to which your interlocutor does not happen to belong, but at all times, in all cases, nefarious politics. I am yet to find an instance in which I will hear that political action helped French business or helped France.

It is true, political government there has much to do with business. One big difference between the two continents is that in the United States the nation's business more or less dictates to lawyers, while in France and in other European countries lawyers more or less dictate to business. This condition is in a degree justified, the nearness of war-equipped, war-trained people, all potential enemies, the multiplicity of frontiers, tariff walls, currency export regulations—all these things which must be dealt with by government are bound to make business more dependent on the political structure than it is in our case. We benefit by our geographical isolation, and we may well be grateful for this distinct advantage. Perhaps some day the dream of Victor Hugo—A United States of Europe—will come to pass and a mass of lawyers will give up their jobs as all-powerful, contending, commanding, fighting premiers, to sit on Boards of Directors and constructively advise hard-working business men on the wise methods of interpreting Federal Government rulings concerning income tax. The picture is not as bad as the Frenchman paints it. In fact, it is not bad at all; a few districts may have gone a little sour, but it will not last. There is hardly a race with greater recuperative powers than those of the French. Out of crusades, out of revolutions, out of Napoleonic world wars, out of the first German onrush in 1870, France always came back. She will come back this time. True, the conditions have changed and France, to recover her place in the economic race of nations, will have to do a certain number of things she does not at this moment feel disposed to do.

As international business develops, competition becomes keener, and the demands on men's capacities constantly grow more exacting. Only the very best men in the right places may hope to succeed. This, theoretically, in conversation, France recognizes but she does not go so far as to put it to practical application. In fact, she cannot apply it without relinquishing some of her most cherished. most anchored traditions. Your French executives will agree that something must be done, but whenever his turn comes he will invariably follow the practice favored by his forefathers. One of the serious drawbacks in the recovery of industrial France finds its source in a social condition which in turn finds its origin way back in the time where the best man was the one who could swing the biggest club and knock out the most people; when physical force was at a premium, and the father so unlucky as to have a daughter to marry paid the prospective husband a handsome compensation. Today the iron male rule has dwindled down to a slide rule, the sword to a surgeon's scalpel or even a penknife; but France, ever in love with her traditions, keeps to the old practice. The marrying males are still bought and paid for. To a young man with a good name the one great goal is to come out of a school the name of which has a quality corresponding to that of his own. When he has graduated—and success in this is always a wearing and narrowing grind—his position is made. Schools in France have a social significance to a greater degree than in any other nation, not excepting the one possessing Cambridge and Oxford. To come out of "School So-and-So" places a young Frenchman much in the same light as when in this country a youth joins automatically a most exclusive club simply through the virtue of being his distinguished father's son.

The family name, the family fortune and the school compose the elements of the equation, the solution of which represents the sum of money the young man may expect in payment for his marriage vows. It may be one hundred thousand or it may be ten million francs. Whatever the figure, the young graduate, during his time in military service and after, thinks of little outside of getting his prize. The wifely requisites—temperament, devotion, sweetness, good looks—are all swept away before the money consideration. A girl coming as a perfect stranger, never seen before, with an indifferent baggage of qualities, may do quite well if the

amount offered coincides with the demand. The father of the marriageable girl is often a businessman, a man with a plant, a bourgeois. If his family name be no older than that of his product, he labels his daughter with a big dowry in an effort to catch for her a place in the higher social scale. When a desirable suitor who accepts the girl for the price offered is found, the engagement is announced and the hour for bargaining strikes. This procedure may take considerable time; drafts of contracts are drawn by the one party to be met by counter drafts more exacting and so skillfully drawn as to put one of our contract lawyers to shame.

The father of the girl is loath to part with the few million cash he has promised as a dowry; he prefers to give it as a partnership in his business. In this way he will keep the cash and keep his daughter closer to her old home. The young man's training may have been for the diplomatic service or for a purely military career; the girl's father may be in the ready-made clothing business, but it does not matter. Immediately after the honeymoon trip to the Italian Lakes, the young officer or diplomat enters the old man's plant and becomes, much to his dismay and to the confusion of all, your factory executive. Often the owner has a son already in the plant, and the two youngsters spend whatever energy they possess in fighting for the control of a business neither can possibly master. In other instances the old man remains the one and only boss and the young man wanders through the office, the plant, and the home, wanting and wanted to be anywhere else. Thus he acquires some bad habits, such as a daily visit to his favorite café, and a profound dislike for his conception of what is work. When the old gentleman passes away, and through inheritance the younger one, then a middle-aged man, assumes direct control, he finds himself utterly unable to cope with his task, and other men under him—men often very capable, men who did not have a sufficient potential social value to become the head of the firm—without authority manage to keep the business afloat in spite of the manager.

The Frenchman loves home life so much that he has been known to have more than one. He is kept so busy maintaining a multiple domestic peace that he has no time for club life. It is too bad! If the French manufacturer of distinction could satisfy his son-in-law with a membership in an exclusive club, thus excluding

him from his plant, then business would gain, by the better man getting the better job. Perhaps some day Frenchmen will become as silly as we are and marry just for love and when that happens French business will improve.

Do not take me to mean from what precedes that there are no good and capable executives in France; it would be far from true. There are many very capable men, men whose accomplishments all of us admire; but the fact remains that the business of the country suffers from the social and economic conditions I have outlined. The French executive is not as a rule receptive to new ideas. When foreign, he often resents them. Inventive by nature, he loves to create, often leaving to other nations the care to develop his inventions. He dislikes to imitate and to him to adopt an idea coming from another is to fall into imitation. At times he will adopt a new way, but first he will want to give it a new form, shape it to his taste, to what he thinks are his wants, and perhaps deform it into uselessness.

There are three main classes in France: (1) The directing, (2) the industrial and commercial worker, and (3) the agricultural. The first or directing comprises the bourgeois described, who loves traditions and politics as he hates traditionalists and politicians. The second is a good, clever worker capable of considerable initiative, gifted with a distinct personal taste and craftsmanship ability. These qualities indicate him more for productions where distinction of design is required than for mass production; mass production often gets on his nerves. He is the man responsible for the French reputation for original, attractive designs in manufacture. By nature undisciplined and independent, he cannot fail to lean towards the revolutionary without losing his self-respect. This, however, is only an attitude; at heart he is as conservative, as saving as his political arch-enemy, the bourgeois or employer. The third is the backbone, the wealth of France. He is the man responsible for the multi-colored crazy quilt of fertile fields that each year draws the eyes of countless admiring Americans. He is more saving of his words, of his goods, and his money than his industrial friend. He loves the land he owns and suffered so cruelly to keep. His clock is the sun; the rotation and exigencies of crops, his line of conduct. He likes the automobile only as it brings city folks to his farm who will pay more for his eggs than

they would bring at the store. For himself he has no desire for automobiles, no desire to move about away from his land. As long as France keeps the farmer as guardian of the land, the country will have nothing to fear.

France is not so badly off. She is still in the international industrial race, is still an object of envy to many, especially the New York dressmakers and jewelers. Her government may be shaking financially, but her people live well and have plenty in reserve. The sun shines, rain falls, things grow and what is done is done with taste. The country is, in fact, capable of getting along and yet affording the luxury of retarding traditions in which we, withour trigger adjusted economic balance, could ill afford to indulge. Furthermore, you must remember that some very fine products come out of France. That the better products are no longer allowed to come in, is, indeed, your misfortune.

To compare with our two or three political parties, France has over twenty. Those twenty parties unite, separate, support, accuse, and betray one another in an unceasing struggle to secure the control of government. In those battles the distinctive planks the various parties stand for are often lost sight of or deliberately shattered and thrown aside. Business prosperity occasionally receive one "in the eye," but that is all one to most politicians.

In Italy there is one political party—only one—and it would be unhealthy for any self-appointed leader to launch a second or a third—not because of the possibility of suppression by the existing government but because of the certainty of immediate, summary suppression by the Italian people. All editorials to the contrary notwithstanding, I maintain that the people of Italy of all classes today have what they want and are happier in their possession than any other nation in Europe. I am not here to propose Fascism for the world; the treatment might not suit other nationalities. It is not my purpose to make this address a political one, but I wish to treat of the Italian executive, of Italian business, and I cannot do so without introducing Fascism, for Fascism has crystallized every square inch, every muscle, every brain cell of Italy. You can talk U. S. A. without mentioning Republicans or Democrats, but you cannot talk Italy without talking Fascism, for the two are now one and the same. Influenced by the sufferings and damages of war, by the revolutionary upheavals of neighbor nations, indus-

trial and commercial Italy was, immediately before Mussolini, in a state of absolute chaos. Trains left from their terminals not on schedule but at the discretion of the crews, and arrived in the same way when they arrived at all. Had we ever heard, at that time, of an Italian steamship line worthy of the name? What have you today? Italian trains cleaner than they ever were before —at times cleaner than our day coaches—and men whose sole business it is to see that they are kept clean and that the seats are kept free from Touristic American feet; trains starting and arriving on the minute over some of the most difficult tracks in Europe with countless bridges, through countless tunnels. You have today Italian steamship lines connecting that country with our own. These lines operate on fixed schedules some of the best and fastest ships afloat, ships which succeed, by wise management, in competing successfully with lines traveling on shorter and more favored routes. Where you had chaos, you find discipline. Where you had swamps, you find prosperous cities like Mestre. Genoa has today a building program deserving the envy of many of our cities.

All this and many similar things, in the short space of a few years by a country having in its natural resources neither coal nor iron. It is significant enough for us to pause and reflect. We on this side of the water with our specialized field of observation are prone to misconstrue the Italian attitude or misunderstand the Italian situation, and yet we are to a certain degree responsible for her actual blessed state. Those of us who judge from here without having the occasion to study the Italian at home are inclined to think of all things Italian in terms of boisterous, gesticulating, dark little men, those Neapolitans and Sicilians who have built so many miles of track for our railroads. The Italian who really does things for Italy today is as different from the popular American idea of an Italian as the ocean differs from a mill pond.

The Italian people want order and method and they are getting it. In the process they may tread on a number of toes but they cannot help it. They want a place under the sun, a good place worthy of their effort; they are willing, anxious to work for it; they ask no favor other than being left alone to shape their destiny. The old complexion of the country has changed. The student body of the country, formerly the noisiest source of disorder, today constitutes a voluntary police force which stands ready

to enforce order wherever needed. In other words, self-discipline is the very spirit of the youth and extends through all the classes, through all the ages of the nation. This is very well for order, but method is more complex of attainment; it requires knowledge. Italy has that knowledge, and there, I repeat, we may have a degree of responsibility. Before the war we usually explained the Italian who came to the States as a good worker but who failed to settle and make a citizen. This Italian, a foreigner, came to America, and, like all other foreigners, criticized our ways. In time his love of the homeland would recall him across the seas and once home, like all returning foreigners, he would begin to preach the American ways he had so severely criticized while with us. If you spend some time in the Italian industries you cannot fail to see the influence of the Italian fortune seeker returning from the United States. You see it through the entire scale from manager to worker and through foreman. Constantly you see men who have inherited American gestures, attitudes, manners of doing things, handling a piece of material, tackling the work at the machine or bench. These men consciously or unconsciously have passed their knowledge, their very make-up to their neighbors to such a degree that the whole industrial complexion of the country is affected. This was not noticeable before Fascism, political chaos preventing any serious observation as it prevented profitable production, but today in the quiet of a complete and productive order one is amazed at the advance made by the industry of that nation.

I would summarize by stating that employing all the good ways it has learned, the country is making a magnificent and fruitful concerted effort to secure for itself a commanding position in the world's industry, and is doing it under a wise, unified control, powerful enough to exclude any weakening interference. The office of an up-to-date Italian business man resembles the office of an up-to-date American business man. In one of them I even noticed a small sign paper-weight with the legend, "No Parking." The business man himself almost invariably greets you in English and shakes your hand in a firm, cordial manner, reminding you of home. There is something midwestern about that handshake. If he is a very prominent man you may be sure he is a Rotarian; if he is not, he knows all about it and wants to be. His sense of quiet solidity is Germanic, but his alertness is more Anglo-Saxon

than Latin; above all, he shows an interested curiosity for and a cordial receptivity to new things that is typically American. He is never tired of learning something new. Like the German, he wants knowledge for the practical application he can make of it, while the French want knowledge more for the zest it gives to conversation. The typical Italian executive always has time to give to an American business man and it is never time wasted. His eyes show that he is taking in everything you say, and if you chance to wander from your subject you will soon find yourself brought back into the right channel by an adroit, if complimentary question.

His handicaps are great—no coal, no iron. He has no time to lose, but if you know something he needs—and he feels you invariably do—he is not losing time in your company but making profit. If you come back a few weeks later and visit the factory you will find that some of your remarks and suggestions have found a practical application. Sober in his remarks, tempered in his habits, he has one goal, and that is achievement for the glory of his Fascist country and for his personal gratification. Very generally he is an Italian of the north. The better modern Italian plant is a model. The engineers and architects have taken the best we have and added to it finishing touches rendered possible by a cheaper and highly skilled building labor. The machine arrangements and layouts are often excellent. At times it is an exact copy of some model plant in the United States. Their labor production is not as good as ours; they know it and want to improve. If the way management, foremanship, and labor are taking to the Bedaux system is a fair indication, they will soon be where we are.

I was astounded when I first saw Mestre, a town on the mainland and now part of Venice. I was going to that beautiful city, famous for so many things but more particularly for its indolence, its love for the lazy, and the soft ways of the gondola. Where an immense swamp and a thousand-year-old small town formerly stood, now there is a Pittsburgh combined with a seaport. Immense modern plants, equipped with the latest and best machinery, receive their raw materials at their doors directly from seagoing ships. The government made the land. Industry gets its for nothing—or practically so—and all corporations settling there are guaranteed to be free from any form of taxes, income or other, for ten years from the date of beginning manufacturing operations.

This already large and growing industrial city is the work of Fascism. Another one is being developed in the Bay of Naples; more of them may come. At Mestre, Italy, which has no coal, manages to manufacture glass, plain and plate, in competition with Belgium. This point alone is significant. Gentlemen, I prophesy that if Italy continues in her present stride with her present leaders, we will soon have in her a friendly but powerful competitor, and the "Made in Italy" label will become a familiar figure in our stores and in our homes.

There is one peculiar handicap from which all Europe is suffering, and against which we will do well to guard ourselves. It is a serious one. I refer to the techincal education of foremanship. The vast wealth of American resources has made is possible for us so far to find technical work with possibilities of advancement for all technical men, and this will undoubtedly be the condition for some time to come. We have even been known to give technical work to men who were handier with a shovel than with a slide rule. We had the work and not the men. In Europe the conditions are altogether different. Education is vastly developed, competition for jobs has brought the youth of those countries to submit themselves to a considerable cramming of knowledge, and as the resources, and consequently the industrial and commercial developments are limited, there cannot be enough jobs to go around. Thousands who almost made the mark but failed—at times through no fault of their own but because of the social customs and conditions I have earlier described—find themselves with a diploma and no chances for a job in which they can use the knowledge of the theories they have mastered. Many years of technical studies, long hours without healthful exercise, and years shut away from the practical world, land a young man, who has been ossified by figures and formulae and sublimated in a false sense of aristocratic mental superiority, into a job as a foreman over a gang of under-educated men, who, by tradition, have ideas verging on the revolutionary or even communistic.

The result is that too often, in Continental Europe at least, the young university-grown foreman, unhappy with his job, runs shy of his men. He will try to give a technical tone to the work of his department, will solve equations proving the penetrating quality of the nails driven by his department, explaining the force of im-

pact of tools against hard spots at given speed, but he will carefully leave alone the things directly concerning his men. He has no idea of their many problems, no understanding of their life and feelings. To him they all are largely social and political enemies—not so in Italy, where all at present have the same ideal, but true elsewhere. He finds it safer to leave them much alone but he surrounds them with a mass of figures, doing no one any real good but at least requiring no direct contact or conflict with his bugbear, the workingman. There are certain industries where a foreman must of necessity be a technical man. There are some good instances in the city of Rochester, but we do not need a technical college graduate as a foreman of a packing department. Education is a very fine thing. We may never have enough, but when we do insist on college graduates for our foremanship we will do well to insist on a similar education for the workingman. The foreman must be the link between management and labor. Besides his work he must know, understand, and sympathize with his men; part of his education must be at their side. I venture to say that the above condition in Europe is very largely responsible for the wide application of day work to labor without any form of incentive. It is the easiest method; it requires no discussion, no contact with the men. It may bring the best man to the productive level of the weakest or worst, but it allows the refined young supervisor, who at heart thinks all this production talk gross and lowly, to preserve his aloofness and dignity.

There is little piecework in Europe, and other forms of wage incentive are still considered experimental ventures. One of the reasons I have just given; another is the low wage scale. The further East you go the more it is felt. We may say that the application of wage incentives is in direct ratio to standards of living. The higher the standards the higher the wage scale; the higher the wage scale the greater the need for labor wage economy. Thus the economy of wage incentive is proven.

The absence of adequate attention to labor cost entails, of course, an inadequate costing of the whole manufacturing cycle. In the many countries I have visited, highly technical and complex methods of cost-keeping may be developed within the precincts of colleges and universities, but you may believe that these seldom reach further than the confines of the textbooks within which they are

held. There are, naturally, isolated exceptions, strikingly complete, but these worthy efforts in no way alter the general complexion of the thing, a complexion one should term as blank. Villar Perosa, in Italy, is, for instance, an interesting exception. This plant, not content to keep an accurate cost on each run, also keeps its cost in constant comparison to a standard cost of a standard unit of its manufacture, a typical ball bearing, known as Bearing B. All figurations on ball bearings made are related to this model type. Piece prices for all operations are expressed in percentage of the figures affecting the model. All cost items other than labor are similarly tested against this yardstick, standard cost. Of course the standard labor cost on the model type and the actual piece prices may contain some inequalities, but as the concern is now applying Bedaux the existing errors, if any, will be easily corrected.

Other fine exceptions I have seen—some in Germany, in England, and in France—but the fact remains that outside of the United States the practice of job costing is more or less unknown. A Continental European executive considering the possibility of installing an elaborate cost system would, of course, consider it in the light of an experiment, and he would see first of all that, as he is spending practically nothing at the time, then his costs—which he senses without knowing——will certainly be increased by the cost of the cost system. That is a certainty, while the eventual saving must be left to an uncertain future. To do it he must take a chance and put money down. He does not like to take chances; he abstains. His excuse is, invariably, "it was good enough for my ancestors, it is good enough for me." In this statement he is not sincere; he knows better. The truth is that he feels he cannot take the chance. We have in America a staggering advantage in that we can nearly always take a chance. We may try the ideas of rainbow chasers; we may make experiments wise or foolish; we may build model after model of new time-saving machines without fear of exhausting our vast resources, without fear of losing our one chance of success. That is largely why we are so far advanced in industrial development. We dare because it is in our make-up; we dare also because we can. It is not safe for Europe to dare as we do; the jobs are too sought after, the business field too crowded, the opportunities too few, the resources too limited. Small resources and small chances of recovery make one

timid, and later, after unhappy attempts, they make one both skeptical and cynical. Do you think that industrial France, for instance, could have and would have taken a chance on Bedaux when it was only an idea without a practical application? She would not have done it. Even if impressed, the fear of penalties in case of failure would have held her hand. The habit of not daring, helped by a racial skepticism, may become a habit of not trying. It is the one true danger which menaces France today.

The further east one goes the lower goes the wage scale, and passing the Red Sea all national attempts at scientific management disappear. In the mind of the Oriental executive labor is simply a commodity of no importance at all—it comes or does not come to work, it produces or does not produce, it eats or starves, it rejoices or suffers, it lives or dies—it is all one. The wage scale is low, the average is known, it is satisfactory, let the details take care of themselves. With an average wage scale of five cents per hour in Indo-China, and twelve cents in Japan, this philosophy harms no one except the labor, and costs are safe. This, as you may see, is a very long way from scientific job costing. A little more consideration for humanity, a little more attention would in those countries bring an enormous improvement. I gave quite some time to conditions in Indo-China, and I estimate at 10 B Hour the rate of production of that rich country. One rubber plantation with its manufacturing plant, which I visited, employs four thousand five hundred workers. I saw and watched nearly all of them; the highest man rated about twenty B Hour. The opinion of the manufacturers of this little known though vast country is that labor cannot be interested in earning more. My opinion is that on a ten-cent wage scale instead of five, with intelligent application, the labor would reach fifty B Hour. To this the manufacturer would say, "Impossible, native labor in the tropics cannot work at that speed." He overlooks the fact that the gangs of women who load coal into ships in tropical sea ports of the Orient work at 60 and even 65 B Hour. I do not expect that these races would ever reach 80—they are constitutionally much weaker than our race—but 50 they could and would reach for what to them would be an adequate reward. Rubber plantation or coffee plantation, by the way, could be more easily placed on Bedaux than the average manufacturing plant in the States. The work is highly standardized

and repetitive. The whole cycle, after land clearing, does not comprise over three hundred operations. Time study men would like the work, too—nice and warm, ninety in the shade in dry weather, ninety in the rain during the wet season, and always a chance of killing a tiger or so between time study observations.

When I used to expand over our success in bringing up production some of you manufacturers would ask me: "Do you think that there are instances where Bedaux would not apply?" I invariably replied "No," feeling that no man would fail to react favorably to a just measure of his effort and a sound incentive. I can no longer say that, for I have found the man. He is the Cambodian, subject of the Kingdom of Cambodia, a French possession lying near the equator between Siam and Annam in Indo-China. This handsome, healthy brown man's motto is:

> "A little fish, a little rice and one Bedaux a day,
> Make for good spirits and keep the cares away."

No one and nothing can induce him to get angry, to get sad or to get to work. Enormous plantations started by the French are invaded by weeds because the brown gentleman, crouching leisurely under a banyan tree, with a light wave of the hand applauds the effort made, and positively refuses to get up for such an awful thing as pulling out weeds. He used to belong to a very active race. Ages ago, undoubtedly with an eye to the coming American tourists, he began getting ready for us the ruins of Angkor, monuments built on such a lavish scale over an area covering a rectangle of one hundred by two hundred miles that one must see them to believe in their true existence. He began the work in the eighth century, he finished seven hundred years ago, and for all I could see, he is still resting.

Since he stopped, the tropical forest has worked in his place, and today French scientists, aided by Annamite labor, work tirelessly, under a killing sun, to uncover what is perhaps the greatest relic of the past left to man. The Cambodian looks on, approves and keeps still. He is, I must say, peculiarly favored in his resolve to live without work. A little patch around his grass and bamboo hut, tilled by the children for the sake of exercise, will give the family all the rice it wants; nearby there is always a sort of shallow pond—Cambodia has millions of them—and the

pond as long as there is water is always full of fish. During the dry season the pond will dry to the consistency of fire-brick, and the fish will die, but for a reason no one could explain to me, as soon as the rain starts the fish are there ready for the Cambodian's frying pan. Even that does not work hard, for the Cambodian would just as soon take his fish straight, alive and raw. The curious thing is that these ponds have no apparent connection with streams or the sea. In the case of seasons going wrong—no rain falling, no rice, no bananas growing—the Cambodian does not rise to fight his way through; he just lies down and dies. He will not be roused. There is one job he loves to do each day, and that is to give his water buffalo a mud bath; that precious task he trusts to no one. He must do it himself. Side by side, one hugging the other, at about 10 or eleven A. M., when the sun gets hot, they enter the muddy pond and begin the daily ablution, the man with both hands spraying water over the massive beast. The Cambodians are so lazy they dance sitting down, and even that leave to their women. There are many races, African and Oriental, who leave the entire burden of labor to women, but the men in every case use the time for hunting beasts or, as in Formosa, hunting human heads for the sake of pure sport; or, again, to get into mischief, such as gambling, as do the Annamites and the Chinese; or to make war, as do all of them—all except the Cambodian. He does not hunt, he does not fight, he neither gambles nor smokes opium. He does absolutely nothing. His sampot, a sort of checkered tablecloth which he wraps around his naked waist, and his water buffalo are his only treasures. He is the one man with no ambition, no desires. He is the Bedaux-proof man. There might be one way to make him act, and that would to take off his Sampot when below sixty. I would not rely on it too much. He might feel suitably attired in his naked smile.

In Indo-China the very spirit of trade deals a severe blow to the principle of mass production. A buyer for some American or European house may enter a shop, see something he likes and ask the price—a vase, for instance. The price he will be told is one dollar fifty; he will then, if inexperienced, explain that he needs a lot—perhaps one hundred—and ask the price per piece on such a large quantity. He will be told anywhere from two to three dollars apiece. He will want to laugh it off, but his noise will be

lost against the impassive smiling face of the Oriental. The price will be higher for a large lot, and the buyer will throw up his hands and walk out. The Oriental, if he knows you, will justify his stand. To have one to sell requires no effort. It is brought in, executed in some obscure corner by some obscure, art-loving Asiatic. To have one hundred made means the application of executive control, the enforcement of discipline, the safe-guarding of quality, the crushing of the artistic inspiration. All of it is a big bag of nuisance, representing responsibility, sleepless nights and spoiled opium smokes. All this damage must be paid for, hence the higher price. Further, he will argue in all good faith that if you see a vase at $1.50 and like it well enough to want one hundred, surely you must like it so much you should be willing to pay $2.00. In that happy country, if not production, at least price, is based on demand, and a severe blow is dealt to the American conception of production methods.

The Japanese is, from my observation, the only Oriental who has learned the advantages of quantity production, but I saw many instances proving that he has not learned to associate sales prices with costs. The sky is the only limit for his asking price, and he gets what he can. There I have purchased articles at 30% of the asking price, and at that may have paid twice too much. Japan has no scientific control of production; job costing is practically unknown; at least 75% of Japanese labor works on day work without incentive, at an average wage scale for men and women, skilled and unskilled, of 12 cents per hour. Production for an intensely industrial country is quite low, ranging between 20 and 25 B Hour, but Japan has something better than controlled production, controlled costs, and controlled labor—it has efficiency engineers. It is the last word in Japan. I do not know what part of the cat's wearing apparel it represents (having been away from here for some time), but I do know it to be the latest in Japanese industrial style. The great bulk of industrial Japan walks awkwardly on those shoes made of one horizontal wooden slat and two vertical ones, but it purchases efficiency calendar pads where you see, written at the bottom, such things as, "The Secret of Success Is Organization." The Japanese have automobiles, but when on foot absolutely refuse to get out of the way. Some may say, "Why not let them have their peculiar shoes, their peculiar

ways, if they are happy"—but they are not. An ambitious people, they want the best place in the world, yet they do not realize that their inability to get out of the way quickly when on foot is a drawback to their automobile industry. Further, many still promenade or go to work in silky, though dark kimonos, and unwilling or unable to step quickly on their stilt-like shoes, in their narrow streets, and still wishing to stay clean, they compel each automobile to carry a sort of wide whiskbroom suspended on the hub of each wheel, another tax on an industry which should be allowed to play unhampered such a great part in the business of a modern, progressive nation.

Japan has pretentions to an intensely modern business development, but she has no typewriter with which to do business, and she refuses to give up her mammoth alphabet of five thousand characters, not counting the frills. Truly progressive Japanese have evolved a simplified alphabet of 45 characters, which all Japanese seem to understand, and so efficient that typists can take letters direct on the machine from dictation faster than we can take down shorthand. It is called the Kana language. American typewriting machines have been made for it, but the ambitious and evidently illogical Japanese people will not use it. The Kana alphabet has not the dignity of the old characters, the dignity of old Japan. There lies the perplexing problem of the Japan of today, the struggle between the striving New and the dignified Old.

Intensely curious and imitative, the Japanese people impress one as wanting the last word in all things without having mastered the first and middle one. They want to be at the top of the ladder of progressive growth without climbing up each rung. I have seen a most beautiful installation in a belt and roller conveyor progressive assembly department, with ten-cent labor working awkwardly at ten B's per hour. Think of the interest on the money lying beautifully dead! As an executive the Japanese is a czar; nothing must stand in his way. For this very reason labor, seldom heard from, is as seldom observed and analyzed and the individual production is low.

All the uncommendable things I say do not prevent the Japanese from being quite a remarkable people. In less than fifty years they have passed from no industry at all to the position of an industrial power we must reckon with, but they still have a long

way to go. They must, above all, become logical and consistent. Their first work should be to outline a program of national growth comprising all factors involved, and work first on those elements which most retard the movement forward. They are essentially skillful, have a good artistic taste, and know clever ways of applying them practically in industry. It is why they predominate on those manufactures requiring designs, such as silks, printed goods, pottery, damascene, etc. In some ways they are more practical than we are. We invite a man to dinner, you cajole him, feed him plentifully, give him a cigar and then expect him to do a little work for you. Comfortably full, he tells you most anything, false or true, that comes to his head, through his digestive slumber. The Japanese is wiser. He invites you to a very early dinner, say five o'clock, then as soon as arrived he makes you work, asks you in ten different ways the same question, and checks the answers to see if they tally. He tries to get anything he can, makes you speak, translates into Japanese, discusses the worth of what you have just said in perfect safety—no danger of your knowing Japanese. He keeps you on pins and needles and on an empty stomach for two hours and only when you show signs of weakening do you get your dinner. After dinner toasts are offered. I thought I understood one word of Japanese and that was "Shigah." As it was employed in connection with my name, I thought the word must mean cigar and that one was going to come my way. I was mistaken. I was only being paid a compliment. The word means "distinguished esquire," and so I smoked my cigarettes.

From all I have said you may gather that we are a pretty remarkable people. After seeing such things as undisturbed Oriental lepers selling fish at a public market in the independent, self-asserting Orient, and then seeing of an evening a happy Oriental at the door of a Honolulu ice cream soda stand, with clean linen, Good American clothes, Broad brim hat, big cigar in mouth, after a good day's work proudly sitting in the driving seat of the family Ford, the whole lot of clean, healthy youngsters packed inside the car with their neat Oriental mother, each enjoying every drop of the favorite soda—I need not appear discourteous to other nationalities when I say that on the whole, gentlemen, we may be eminently grateful for being permitted to do just what we are doing, and reasonably proud of being what we are.

Tanning and Leather Products Costs

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EDITORIAL DEPARTMENT NOTE

There are a good many manufactured products which have a common source of raw material, the raw material being a unit or lump product which must be split up into different grades having markedly different values. Thus in the petroleum industry, the barrel of crude oil is broken down by distillation into many different products of commerce, the more common of which are gasoline, kerosene, benzine, lubricating oils, naphtha, paraffin, etc. Since the barrel of crude is purchased as a unit, it is a nice problem in costs to derive the costs of the raw material entering into the several products. Similar situations obtain in the lumber, packing and some mining industries. The present paper treats of costs in the tanning and leather products industries, where something of the same problem is met.

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TANNING AND LEATHER PRODUCTS COSTS

BEFORE I go into the technical description of a tannery cost system, I think it will be well for me to give a general idea of the tannery business. There are, of course, many kinds of tanneries, such as upper leather tanneries, tanneries covering the more delicate leathers, such as glove leather, sole leather tanneries, and tanneries for such products as belting leather, harness leather, and other leather products. Here, I will give a description of the cost system of a tannery tanning mainly belt leather, sole leather, and similarly tanned leather. I wish to point out that tanneries differ a good deal in methods and detailed operations, and that therefore this description will by no means fit all tanneries.

The first thing to be considered is the kind of hides that are to be tanned. For tanning the leather just mentioned, practically only cow and steer, or cattle, hides are used. However, there are very many different kinds of cattle hides. The first classification is according to the country they come from, such as, besides native hides, South American, Italian, Dutch, Swiss, Javan, etc., each of which has different characteristics, and the tanned leather of which will be different in some respects. Hides are then further considered as to their "take off," that is, as they are generally termed, "packer" hides or "country" hides. It makes very much difference in the tanned leather whether a hide was taken off by a farmer, or country butcher, who knows very little about skinning the animal, or by the large packers, who employ specially experienced men for skinning the animals. As a matter of fact, the packers consider the skinning important enough to divide into a number of operations, paying the different skinners different rates of pay, according to what part of the hide each one takes off.

In this country, packer hides are usually classified as follows: Spready Native Steers, Heavy Native Steers, Light Native Steers, Extra Light Native Steers, Heavy Native Cows, Light Native Cows, Heavy Texas Steers, Light Texas Steers, Extra Light Texas Steers, Butt Branded Steers, Colorado Steers, Branded Cows, Native Bulls, and Branded Bulls. Country hides are usually classified as follows: Extremes, Buffs, Heavy Cows, Mixed Cows and Steers, Heavy Steers, and Heavy Bulls. Of course, the

classification as I am giving them here are only general and for the purpose of correcting the generally mistaken idea that "a hide is a hide."

It also makes a difference as to when the cattle are killed. Cattle killed during cold weather have longer hair and are troubled with grub holes, and the skins in general do not seem to be in the same healthy condition as those of cattle killed during the late summer months and fall. For that reason, a concern manufacturing products from the best grades of leather will endeavor to buy all of its hides during the latter part of the year.

I might also point out that since the hide is a natural product, no two hides are the same, and the tanned leather of each hide will be somewhat different from that of the others. This makes it difficult for the tanner to gauge the amount and kind of raw materials —that is, the kind of hides he should buy in order to meet specific demands. Hides cannot be bought, as a rule, to produce a specific kind of leather—that is, leather of a certain thickness, grade, or even size. I mean, for example, that you may put into the tannery many hides, each one weighing forty pounds, and each one considered an A-No. 1 packer take off, and yet they may vary considerably in thickness and also in the quality—that is, the texture of the leather—and also the size of the tanned hide.

Hides are usually bought through hide brokers, f.o.b. the selling point. Therefore the tannery pays the freight on the hides. The broker receives a small commission for the purchase.

Upon receipt of the hides in the tannery, they are usually salted and stored away. To prepare the hide for the tanning, it is put through a number of operations, usually called "beam house operations." In the beam house, the hide is thoroughly cleaned, the hair taken off, and also the fleshings—some of which remain even after the careful skinning of the experienced packer man.

When the hide leaves the beam house, it is referred to as being "in the white," and is sent from the beam house to that part of the tannery which is called the "handlers." This part of the tannery is called the "handlers" because here each hide is nailed to a large stick, by which it is hung into the vats—which contain, first, a very weak tanning liquid; and each day the hides are taken out, or "handled," and put into another vat, with stronger liquor. The

hides are continually shifted, being put into stronger liquors each day for about thirty days, at the end of which time they are taken out and placed into that part of the tannery called the "layaways."

In the layaways the hides are laid out flat, one upon another, with ground bark placed between them, and immersed in a strong tanning liquor. The hides remain in the layaways for varying lengths of time, according to the thickness and texture of the hides —some of them remaining in the layaways six months. During the time the hides are in the layaways, however, they are taken out about once a month, to change the position of the hides, and to fill the vats with fresh liquor. Sometimes the coarser parts of the hide, such as the bellies and the shoulders, are cut off from the hides while in the layaways. The reason for this is that the parts just mentioned, being more porous, tan so much more quickly, and may become overtanned if they are not cut off from the hide.

After the hides have been thoroughly tanned, they are taken out of the layaways and put through a set of operations usually termed "tannery finishing operations." Here the leather is soaked in warm water for twenty-four hours, loosening the bark and cleaning the leather in general. Its surface is then scrubbed by means of a machine brush. After the scrubbing operations, the hide is put through a bleaching process, which removes any excess tannin and also leaves a uniform color. It is then sammied—i.e. packed down —and partially dried; a coat of oil is then put on both sides, and the hide is put into a dry tube for drying. The leather that comes out of the dry tube is, of course, tanned leather, and usually referred to as rough leather. It is called rough leather to distinguish it from finished leather. It is from finished leather that the various leather products are manufactured.

In order to convert the rough leather into finished leather, it is put through a series of operations in a department usually called the Curry Department. Different parts of the hide are used for different purposes, the parts, in order to obtain the proper finish, going through different operations in the Curry Department. Therefore, if the whole hide has not been cut into different parts in the tannery, this is done at this point. The whole hide can, of course, be divided up into very many ways, but the usual cutting of a hide is as follows:

Head, which is mostly used for cutting soles;

Shoulder, used a good deal for welting, which is used in the manufacture of shoes; also for cutting soles, as well as numerous medium grades of leather products—bag leather, harness leather, straps, packings, etc.;

Bellies, from which are made such parts used in the manufacture of the shoes as insoles, box toes, counters, and cheaper leather products, such as straps and skate backs.

The remainder is the bend, which furnishes the best leather. The bend is used for all kinds of leather products in which a fine quality leather is needed, such as leather belting, fine quality soles, best kind of strappings, and large packings.

A Curry Department that is equipped for currying leather for different purposes will have as many as 35 or more operations. Of course, that does not mean that any one kind of leather will go through all 35 operations, since different kinds of finished leather will require different operations in the Curry Department in order to obtain the special finish required. One of the important operations in the curry shop is the stuffing operation—that is, stuffing the leather with oils and greases for the purpose of obtaining the desired pliability and strength. Another common operation is rolling, which is done in order to give the leather a smooth surface, and to compress the fibres thoroughly. Operations in addition to these are the splitting, for the purpose of making the leather absolutely even; oiling; coloring, when required; buffing, which is an operation consisting of taking the grain off, giving the leather a more velvety surface.

The leather is finally dried by means of an artificial draught.

After the leather is curried, it is put into stock, either to be sold to manufacturers of leather products, or to be used by the different departments of the company in manufacturing leather products.

This paper will give first a description and explanation of the cost system as applying to the tannery and curry shops and will then devote some time to a consideration of leather products costs. There are very few tanneries that manufacture leather products. Therefore, the manufacture of leather products is absolutely separate and distinct from tannery and curry work. As a matter of fact, there are very many tanneries which do not have curry de-

partments. These tanneries may sell to manufacturers of leather products, who also have no curry departments, but send this rough leather, bought from a tannery, to a company which does only currying. So I am actually describing cost systems of three distinct manufacturing organizations.

Tannery Cost

The cost system of a tannery, as a rule, is comparatively simple; but in connection with obtaining costs, a good deal of statistical information should be got to guide the tannery organization. Many tanneries have a separate set of records for the statistical information, but I believe that wherever it is possible, the cost system should also accumulate all general manufacturing statistical information.

A tannery, as a rule, does not buy a certain kind of hide from one packer all of the time—far from this! The tannery, in the first place, needs many different kinds, and again, it naturally wants to do as good "shopping" as possible; so that a tannery that tans a thousand hides a day will make a good many purchases of various kinds of hides from different places. Therefore, when the buyer makes a purchase of a lot of hides, he will be interested to know just how much, and the quality of, leather obtained from that particular lot.

The first information that the cost department receives is that a lot of hides has been ordered. The cost department will immediately give this a lot number—or, as it is usually called, a "stamp" number—in order to designate the purchase. These stamps are stamped right into the hide, and are quite distinguishable when the leather is tanned.

The information regarding the purchase is written in the hide stock ledger. A sheet is opened up for every purchase—that is, every stamp—and when notice of the purchase is received by the cost department, the following information should be entered on the hide stock ledger sheet:

Kind of hide,
Stamp number,
Date of purchase,
From whom bought,

Quantity bought,
Purchase Price,
Terms,

Any special information that may pertain to the purchase.

Upon receipt of the hides, a receiving slip should, of course, be made out, showing such information as:

From whom received,
Car number,
Stamp number,
By whom received,
Date received,
Number of hides received,
Weight.

It is customary to take a certain number of hides from each car, weigh them as they come from the car, then sweep them very thoroughly and then weigh them again. The tanner expects a certain percentage of manure and dirt to cling to the hair, but if it is above a certain percentage, a claim for rebate is made and generally allowed. The inspector will note also at this time the condition of the hide in general, such as its wetness, whether it has long or short hair, whether coarse or fine, and whether clean or dirty salt was used; the amount of manure dirt, and its condition in general. A copy of this receiving slip is sent to the hide stock ledger clerk, who will immediately obtain the invoice for this shipment, and then make the following record in the hide stock ledger under that particular stamp:

Date received,
Number of hides,
Invoice weight,
Receiving weight,
Tare per hide,
Total amount of tare,
Net weight,
Average invoice weight,
Price per pound,
Amount.

I might say right here that, except in the more modern tanneries,

where it is possible to do so, the invoice weight is used in making charges from one department to another, instead of a receiving weight or the weight of the hides when they are taken from the hide cellar. It can readily be seen that the weight of the hides as they come from the hide cellar cannot be used, as this would vary according to the length of time the hides are in the cellar. As a rule, hides are quite damp when received, and if they are put in a dry hide cellar, the longer they are there, the drier the hides will be; and therefore it would be impossible to check out the grand total weight, as a good deal of the weight would be lost in drying out.

There would only be two possible ways of using the receiving weight. One of them would be to weigh each hide individually, and use some method of tagging the weight on that hide until it is tanned, either by means of stamping the weight into the hide, or by means of tagging it in such a way that it can be read when it comes out of the tannery. This, of course, would be a very expensive method, and as far as I know, it is not being used, since first, it would waste a good deal of leather to stamp the weight into the hide, and second, it would take a good deal of time and expensive tags to tag the hides and keep the tags intact during all tanning operations.

The other method, of using receiving weight, can be used in the more modern tanneries that are laid out properly according to modern production ideas. I am now referring to the possibility of putting through hides in the tannery in lots of certain quantities, say for instance, lots of fifty. If a tannery is laid out in all its operations to receive fifty hides—and the more modern tanneries are laid out this way—so that it is easily possible to keep them intact, it would be a simple operation, when hides are received, to weigh them in lots of fifty, each lot being given a number, and if that lot of fifty is thus kept intact right straight through the tannery, the cost department will then be able to place against the receiving weight the cost and actual amount of leather obtained from that lot.

However, the older tanneries are not laid out that way. One operation—for instance, the soaks in the beam house—will be laid out to receive, say seventy hides per vat; the paddle wheels for removing lime, etc., may be laid out to receive, per paddle wheel,

thirty hides; the handlers may be laid out to receive forty per vat; etc.; so that it would be an impossibility to run the tannery at full capacity, and yet keep lots of a certain number intact. By using invoice weight—or, as it is usually called, "green" weight—we of course do not know how good a purchase a stamp number is until all of the hides have been tanned. Then, by placing opposite the invoice or green weight the amount of tanned leather obtained from that purchase, and obtaining the percentage of yield, the hide buyer can get a fair idea whether that particular kind of hide is profitable or not.

Tanneries may have two or more special divisions in which they may tan different kinds of leather; and in that case, the comparison of the white weight—that is, the weight after the beam house operations—with the green weight, would be used to charge the hides to the different divisions. For instance, the average weight of a hide in a purchase of a thousand hides may be 45 pounds. During any one time, two hundred hides will be put through the beam house, but one hundred of them go to Division A, and the other hundred to Division B. Now, it may be possible that the lighter hides—although the hides may average 45 pounds, they will actually vary as much as from 35 to, say, 55 pounds—are sent to Division A, and the heavy ones to Division B. By weighing each of the hundred hides in the white—that is, the weight after the beam house operations—it is possible to make a fair charge to each of those divisions on the basis of the white weight, compared to the average green weight. This method does not work out absolutely accurately, but is about the fairest method, without going into a good deal of red tape, and it explains why invoice weight is used when receiving weight cannot be used.

The columns in the hide stock ledger that are used for cost purposes are:

Number of hides,
Invoice weight,
Average weight,
Price,
Amount.

The other information—that is, number of hides received, and

receiving weight, tare of each, grand total tare, and net weight—is only statistical information.

The hide cellar expenses, the biggest part of which is labor in receiving and piling hides, can be treated two ways in the cost system. One of them is to take the total hide cellar expenses for the month, and pro rate them over the cost of the hides received that month. Another method is to consider the hide cellar expenses as overhead expenses to the tannery as a whole, or beam house expenses.

If all of the hides are purchased and received during only a few months of the year, it is usually considered best to pro rate the hide cellar expenses over the hides received, as stated first. Otherwise, since the expenses would be large in those few months, and very small in the others, the tannery overhead would fluctuate a good deal. If, on the other hand, about the same number of hides is received per month, the hide cellar expenses can be, if desired, charged to the beam house overhead.

When the hides are taken from the hide cellar into the beam house, a report must be made to the cost department, showing the number of hides taken out by stamps. Usually the number of hides going to process is about the same per day—that is, tanneries as a rule run on a schedule basis—if business is good, at their capacity; and if business is poorer, at a corresponding decrease. It can readily be understood that this is the natural thing for a tannery to do, since tanning is a long time process.

This information is recapitulated each day until the end of the month, at which time the total number of hides, its corresponding weight, and the cost of each stamp that was put into process, is credited to the hide stock ledger and charged to a tannery goods-in-process ledger. Some tanneries divide the tannery goods-in-process ledger into four divisions: the first one showing the hides that are in the beam house; the next showing the hides that are in the handlers; the third one showing the hides that are in the layaways; and the fourth one showing the hides that are in the finishing operations. Although some tanneries may have reasons for dividing the goods in process in this manner, it is usually considered adequate simply to have one goods-in-process ledger for

the hides that are in the tannery, irrespective of in what division of the tannery they may be.

For the purpose of obtaining the labor and overhead cost, however, three divisions, or more, are made, even if only one goods-in-process ledger is carried for the entire division. Since at this point we have charged the hides into tannery goods in process, and nothing will be done as far as this goods-in-process ledger is concerned until the hides are finished, I will now explain how the labor and overhead costs are obtained for each division.

A set of expense accounts is opened up for the three divisions, that is, beam house, tannery yards—which comprise the divisions of layaways and handlers—and finishing operations, or more sets, if a finer division is desired. The set of expenses would be such as the following:

Beam House Expenses:

Labor, to which is charged all of the labor working in the beam house,
Foremen's salaries,
Manufacturing materials,
Supplies,
Repairs,
Proportion of general plant expense,
Fixed charges,
Sundries.

The same divisions of expenses can be made up for the handlers and layaways—together or separately, as may be desired—and for the finishing operations.

Each day the tannery reports the number of hides that passed from beam house to tannery yards, and from layaways to finishing operations. This is recapitulated by the cost department, so that at the end of the month the cost department will have the information concerning the number of hides that were in each one of these three divisions at the beginning of the month, the number of hides that were received during the month, and the number of hides that were passed out during the month. Since, as stated above the number of hides going into the tannery and the number of hides coming out of the tannery, is usually the same per day, it is right to consider that the average of any of these divisions is half way through process.

The following example will explain how the labor and overhead costs of the hides passing through the divisions are obtained:

	Pounds Hides	Cost per Pound	Amount
On hand	100,000	.10	$10,000
Received	60,000	..	8,900
Total	160,000	..	18,900
Disbursed	50,000	.18	9,000
On hand ..	110,000	.09	$9,900

In the above example, we start out with 100,000 pounds in process, against which there is a labor and overhead charge of $10,000. 60,000 pounds have been received during the period, making a total of 160,000 pounds before disbursement. The disbursements amounted to 50,000 pounds, leaving 110,000 in process. On the other hand, the expenses for the period were $8,900, which, added to the $10,000, equals $18,900. In order to find out how much the disbursement price should be, and leave half of this disbursement price against the goods on hand, divide the quantities disbursed—that is, 50,000—plus half of the amount on hand, which is 55,000—or a total of 105,000—into the total expenses, $18,900. This gives a price of 18 cents per pound; therefore, the 50,000 pounds are disbursed at 18 cents, leaving 110,000 pounds at 9 cents a pound. As mentioned before, the reason the price per pound remaining is half the disbursing price is because the hides in process are considered half way through.

When the leather leaves the dry tubes, a weight is taken of each hide by stamps each day. This information is recapitulated by the cost department to obtain the totals for the month. The cost clerk will then credit the goods-in-process ledger with the number of hides of each stamp that come out of the tannery during the month, placing that amount temporarily on this recapitulation sheet. At the same time, he will credit the labor and overhead sheets of the three divisions as explained above with the labor and overhead cost per hide in the beam house, the labor and overhead cost per

hide in the yard, and the labor and overhead cost per hide in the finishing operations—thus obtaining the grand total labor and overhead cost which, added to the hide cost, will give the total cost of the leather produced. By dividing the pounds of leather produced into the grand total cost, as just obtained, the price per pound is arrived at.

This leather is now charged to a rough-leather stock ledger by stamps, if desired, or the stamps can be lost sight of, piling all leather of a kind together, irrespective of hide stamps. If parts of the hide, such as the bellies, had been cut off in the layaways, and had naturally therefore been finished before, the value of the bellies would be credited to the remainder of the hide, thus obtaining the cost in practically the same way.

In charging the rough leather from the tannery, a very important point to be considered is that, although the leather comes from dry lofts apparently dry, it usually contains a little moisture, and is apt to dry out more if it is any length of time in the rough leather store room. It has been found that leather that came out of the tannery during the summer, when the air contained a good deal of moisture, and was stored until winter in a store house where the windows were closed and the house heated by steam, lost between five and seven percent of its original tannery weight. To cover this shrinkage, instead of using the actual tannery weight, a percentage is deducted, usually two to three percent being considered sufficient unless it is expected to store the leather a long time.

Curry Costs

When the tannery operates its own curry department, the rough leather stock is usually considered as part of the curry department. I mentioned before that it is not customary to put the whole hide through the curry department. Therefore, the first thing that is done is to cut the leather according to requirements. Obtaining costs of leather that is cut into the different parts is one of the big problems in establishing leather costs. The usual way is for the curry department to make a report of the parts, such as butts or whole hides, that are drawn from rough leather stock, and to show into what parts this leather has been cut, and the weight of those parts. The cost department will credit the whole hide or the butt

with the average cost as shown on the stock ledger, and price the several parts that have been cut from the whole hide or butt on the basis of market values.

At this point I must explain to you that the different parts, bellies, shoulders, and bends, because they are different in texture and strength, have a different value. For instance, bends may be worth seventy cents a pound, shoulders forty cents a pound, and bellies only twenty cents a pound. The usual way of pricing these different parts is by using the selling value as a ratio for establishing the cost values of the several parts. This means that if the cost of the butt is a certain percentage under the market value —say twenty percent—then the individual parts will be marked twenty percent under the market price. Some tanners, on the other hand, use the method of pricing the several parts at actual market values, and taking a tannery profit at this point. This method is used by those tanneries to show under each division—that is, tannery division and curry division—whether it is showing a profit.

A curry department that carries a good many different kinds of leather will put through the different kinds of leather in lots—usually in about a hundred pieces to the lot. The curry department reports each day each lot of leather that is drawn from the rough leather stock and put into process in the curry department. It will show, besides the lot number, the kind of leather, what it will be curried into—as, for instance, shoulders may be curried into welting shoulders, russet strap shoulders, harness shoulders, etc.—and rough weight of the lot. This information is recapitulated in the cost department so that at the end of the month the cost department will have information as to the number of lots and total weight of different kinds of leather that were withdrawn from the rough leather stock ledger according to the kind of finish that it is to be made into.

The rough-leather stock ledger is credited with the value of this ledger, and a curry department goods-in-process sheet is opened for each kind of leather that it is to be finished into, and the leather charged on to these goods-in-process ledger sheets accordingly. This leather that is charged into the goods in process remains there until it is delivered as finished leather.

The labor and overhead costs of the different kinds of leather

are obtained in a way similar to that used for the labor and overhead cost from the tannery—that is, first of all, a set of expense accounts is opened up, as for instance such as direct labor, indirect labor, salaries, supplies, manufacturing materials, repairs, proportion of general plant expense, fixed charges, and sundries. All curry department labor is reported according to the kind of leather. When I say "kind of leather" I do not mean simply shoulders, but kind of shoulders that it is to be finished into, such as welt shoulders, russet strap shoulders, harness shoulders, etc.

This labor is distributed at the end of the month by the various kinds of leather, and charged into the goods-in-process sheets accordingly with its proportionate overhead—the overhead being prorated on the basis of direct labor. At this point, we have, therefore, the cost of the leather that was charged into goods in process by the different finishes, the cost of the labor, and the cost of the overhead. In order to obtain the cost of that part of each finish that was finished or put into finished leather stock, the following method is used:

The curry department reports each day the lot numbers that were finished, with the finished weight of each, which will always be different from the original rough leather weight, and this information is recapitulated until the end of the month. The lots which were finished according to this report are credited to the goods-in-process ledger sheets at the price that those lots were charged into, and with that leather cost, labor and overhead costs are charged, these labor and overhead costs being obtained in the same manner as the labor and overhead cost of tanned leather explained above—that is, considering the balance as half way through, and charging the rest of the labor and overhead to the leather that was finished. Of course it is true that the production in the current department is not necessarily as even as the tannery, and that in many cases the balance left in process may be more or less than half way through; but since the curry process is usually two weeks or less, any misstatement of costs on this account is readily corrected the following month. This labor and overhead is credited to the curry goods-in-process ledger, and with the leather cost, is charged to the finished-leather stock ledger according to kind of finish, by its finished weight.

In weighing this leather into the finished leather store room, the cost department must again consider the fact that leather is apt to dry out while in storage, and a percentage should be deducted from the finished weight—in this case, usually one to one and one-half percent, since finished leather is only made for order, and is therefore not held in stock very long.

Leather Products Costs

In talking about leather products costs, I again want to remind you that leather is a natural product and that there are practically no two pieces alike. The manufacturer of steel products, rubber products, and even lumber products, can buy the raw materials according to specifications—that is, size, thickness, grade, quality, etc. A manufacturer who produces an article from a certain thickness of wire buys that particular thickness, and the grade and quality of wire needed, and cuts it and works it up to produce his finished product.

The manufacturer of leather products, however, has not the opportunity to buy exactly for his needs; he must buy his leather, as a rule according to certain cuttings, as outlined before—as, for instance shoulders, bends, bellies, or assortment of scrap. If most of his article is produced from shoulders, he will, of course, buy shoulders, but he will not be able to cut up one shoulder for a particular order, since there are different qualities and thicknesses of leather in any one shoulder. He may have an order which requires the best part of the shoulder, and in cutting for that order, he may perhaps use up fifty percent of the shoulder, but his problem then is to obtain orders to use up the rest of the shoulder and the scrap that result from the cutting for the first order.

In this connection, the cost man of a leather products company has a very difficult problem. Every time one piece of leather is cut into two pieces, no matter how it is cut, the two pieces will have different values, as compared to each other and as compared to the original piece that was used. You can readily appreciate the problem when you consider that pieces of leather of any imaginable shape are cut from different parts of leather, so that, in the first place, you may have an odd shaped piece of leather from which you are going to manufacture a finished article, and you will also have an odd shaped piece of leather remaining, which you will have

to use to best advantage at some other time. It is up to the cost man to price these different pieces at their proper values. I do not want to discourage you in any way regarding leather costs, and I think it is sufficient to say that there are about four thousand sortings of scrap.

The only way to correctly obtain costs of leather products that are made in small quantities at different times is by means of the order system—either by customers' orders or stock orders.

When an article is to be manufactured, an order is made out for the quantity to be manufactured. The cost department must, of course, have a copy of this order. When leather is withdrawn from the stock room for the order, it is weighed, and a requisition made out showing the order it is to be used for, kind of leather withdrawn, and its weight. This requisition is used in the regular way for crediting the stock ledger with the quantity and cost of the leather withdrawn, and that same amount charged to the order. All labor spent in manufacturing an order is charged to that order, and with this labor, a proportion of the overhead of the department. When the order is completed—or, if it is a large order, while the order is in process—the leather not used, mostly scrap, is returned to the stock room. As mentioned before, the valuing of this leather is difficult, but very important. Some companies consider it worth while to take all of the scrap from an order, and have it immediately sorted according to the different grades of scrap, and a report made out showing the pounds of the different grades of scrap produced. From this report, proper credit can be given to the order. Some companies find that it is too costly to sort all of the scrap in this manner, and if it is a large order, will only take a portion of it and make a test sorting of it, and price all of the scrap returned upon the basis of this test sorting. A third way—not nearly as accurate, but which is good enough when the scrap runs fairly uniform and low in value—is to place an estimated value upon the scrap, without any sorting.

Sometimes two or three different articles to be made from different orders are cut at one time from one kind of leather; in that case, an order is first made out for the cutting of the leather, to which is charged the leather withdrawn, and labor and overhead for cutting, and credits given for the scrap. The result is the cost

of the total of the various parts of the leather cut, but not the cost of each of the parts.

When this cutting order is completed, the quantity and weight of each of the parts cut are given to the cost department. If the articles cut were anything except leather, it would be natural to pro-rate the total cost of the order according to the weight of each of the parts cut, but this would usually result in incorrect costs. In the first place, it is possible that one of the parts was cut from the best part of the leather, and the other parts from the poorer part of the leather; or it might be that some of the parts cut are of the same quality as the others, but very small. In either of the cases just stated, it would be absolutely unfair to pro-rate the cost of the order on the weight basis. All of you will readily understand that it would be unfair to pro-rate this order on a weight basis, if some of the pieces cut are of different quality leather than others. In that case, the cost department manager must establish a ratio on that account. He can do this in a good many ways; as a matter of fact, it is done most accurately if based upon the experience of past cutting records. I might say that in general, this ratio is obtained by considering the different values of the leather from which the different pieces would have been cut if cut separately.

It is not so easy to understand why, if different pieces of leather, some of them very large, others quite small, cut from the same quality of leather, should not bear the same price per pound. However, since leather is something that cannot be moulded and made into a large piece, the fact is, that the larger the piece of leather, the larger the value per pound, the quality being the same. Therefore, while a large piece of A-Quality leather may cost $1.25 a pound, that same quality leather in pieces of about four square inches may cost only 12 cents a pound. Therefore, it is obviously unfair to price the small pieces of leather at the same price per pound as the large pieces of leather, since the small pieces of leather could have been cut from leather at 12 cents a pound, instead of from leather at $1.25 a pound; whereas, the large pieces, on account of their size, had to be cut from the $1.25 a pound leather. The ratio to be used in establishing the proper values

between the several pieces is obtained by considering from what size leather the small pieces could have been cut.

After the several pieces have been priced according to the method just cited, the order is entirely closed out, and the several pieces of leather charged to the different orders on which they will be manufactured into finished articles.

Experiences with Budgets to Aid Management

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EDITORIAL DEPARTMENT NOTE

The idea of the budget is inherent in all planning of business operations. In many quarters, there is not, however, a full appreciation of the advantages accruing from the development and operation of a complete system of budgetary control. Some experiences with budgets in the metal cutting industry are presented in our current Official Publication.

The author, Lester F. Blake, of the Boston office of Lybrand, Ross Bros. and Montgomery, after graduation from high school, entered the employ of a large automobile manufacturing company where he served first in the capacity of a mechanic in practically all of the manufacturing departments and also as timekeeper, cost clerk, and cost accountant. He then spent two years in the employ of Brown and Sharp Manufacturing Company where his duties included the compilation of the cost of all kinds of products manufactured by the company. In 1915 he entered the employ of a concern which owned and operated some twelve different businesses, five of which were foundries and metal cutting industries. Here he had general supervision of the manufacturing and financial operations of these several businesses. He then became general manager of a gray iron foundry doing a general jobbing business and employing about 500 people. Here he had entire control of the business, supervising the manufacturing, sales, and finances. In the latter part of 1918 he entered the employ of Lybrand, Ross Bros. and Montgomery, Public Accountants and Auditors.

His service as a public accountant has been confined almost entirely to metal cutting industries which range from the manufacture of ammunition, small arms, foundries, and machine tools to shipbuilding. During his professional career he has been intimately connected with the installation and operation of cost systems and systems of budgetary control.

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EXPERIENCES WITH BUDGETS TO AID MANAGEMENT

COLONEL ROBERT H. MONTGOMERY in his "Financial Handbook" defines the budget as follows:

"The business budget is a modern adaptation to business of an ancient method of controlling public or social receipts and expenditures. It is one of the rare instances in which the business man has been able to learn something from the politician. The business budget is not in general use, but businesses which have adopted the budget system are the most progressive and profitable in the country. It is an innovation which may be tried out without risk.

"The budget is prepared from estimates or forecasts, for a definite future period, of the expected operation in each functional department of a business. The forecast of each department is dependent upon the anticipated activities of all other departments: for example, a manufacturing program must be based upon expected sales and the estimate of sales is limited by the producing capacity of the factory."

It has been my experience that the greatest aid to management which can be obtained from budgetary control is the method of correlating the activities of one department of the business to those of all the others. The various activities of a business, such as sales, finance, administration, production, purchasing, etc., constitute a chain, each department being a connecting link and, as has so often been pointed out, the weakest link in the chain constitutes the strength of the chain or in this instance the strength of the business. If through good organization each department operates efficiently, effectively and successfully in meeting the requirements of all other departments and the general public, then the chain is strong. If, however, one department, such as sales, is weak and is not obtaining the necessary volume or giving proper service to customers the chain is weak and the other departments, or links in the chain, are affected thereby, to the extent that disorganization and disintegration rapidly take place. It is in the attempt to weld the several links together into a strong serviceable chain of coordinated operations that methods of budgetary con-

trol have been established to meet the requirements of modern industry.

Before taking up in detail the several examples whereby budgetary control has assisted management, let us consider the problems which the management of a large industrial concern is called upon to solve. By the management, I mean the executive body or individual who has complete control of all the activities of the business and to whom the executive heads of departments are responsible. In the first place the executive must manufacture the right kinds of products, that is, the kinds of products which can be sold profitably and in satisfactory volume. His next step is to procure a sufficient volume of sales to enable him to manufacture in such quantities that economical production can be obtained. This must be done with a minimum amount of investment in inventory and fixed assets, borrowings must be kept at or below a figure whereby the expense of the money borrowed will be commensurate with the volume of business procured. Relative to the details of the production, the management must furnish the procedure whereby raw materials from which the product is manufactured will be on hand in sufficient quantities so that production programs will not be interfered with. The management is also responsible for establishing an efficiently operating organization which can skillfully and efficiently obtain materials, produce the product and market it in the most economical manner.

When speaking of these problems in a general way they do not loom to such great proportions. In the instances where I have had opportunity for personal observation, especially since being in professional work, it has been obvious that the failure to operate successfully has been because the proper relation of one department of the business to another has not been properly established and the benefits to be obtained from properly applying the correct relationship have been ignored to the detriment of the business as a whole.

There are still many businesses operating on the plan that the capacity of the plant shall control the volume of product manufactured and that the selling department shall be required to sell all of the product irrespective of the buying capacity of its market. This may seem to be an absurd statement to many of you who are

operating in accordance with sound principles and have the production programs controlled by the total amount of possible sales for a definite period. I have been called as a professional accountant to assist in reorganizing many companies whose primary trouble has been that the requirements of the production department have been considered the basis of operations.

It is my purpose in the rest of my talk to describe to you certain experiences that will illustrate the benefits which have been obtained by management from correlating the activities of the several departments of their business. Before taking up the details I would like to state that the success of the budget is based almost entirely upon the correctness of the figures which are to be obtained from the accounting and cost accounting records of the business wherein a correct history of the activities of the several departments is portrayed. This history, divided into periods and cycles, compared with the general business cycles, is the basis for the successful operation of any scheme of budgetary control.

Some time ago I was called to a conference with a local banker relative to the present financial position and future prospects of a concern whose chief business was the manufacture and sale of a high grade line of gauges used in connection with the operation of high pressure steam power systems. This concern also made a quality product of valves for high pressure steam and water lines. I was asked if I knew anything about the financial position of this company, what was the cause of its present embarrassment and why the sales of the company were steadily decreasing from year to year. I informed the banker that I had no knowledge of the present financial status of the company and did not know anything about its general operating conditions. "Such being the case," said the banker, "I want you to visit this concern, investigate its present financial position, ascertain what is wrong with the management and, most important of all, what factors have produced the generally poor operating results which have taken place during the past five or six years. This is very important to us as we have loaned this company very heavily and wish to get our money back without having to go through the processes of receivership or bankruptcy proceedings."

I accordingly visited the concern, made an examination of its

records at a specific date and for the five or six years prior to that date. I found that the company had large investments in inventory and fixed assets, far in excess of the actual needs of the business as disclosed by the sales volume for the past several years. The company at the time of my investigation was producing to the full capacity of its factory in spite of the fact that sales were decreasing steadily from an apparent lack of proper sales effort or from the impossibility of the concern to manufacture economically enough to compete with other manufacturers in its own line. The company's general offices were located in an expensive office building in the main part of the city and the factory was situated in a fairly good location in the suburbs.

After definitely establishing the financial position of the company as at the end of its last fiscal year and ascertaining the results of its operations for the past ten years, we found a very sad situation and unless something radical was done immediately it was our opinion that the company was headed for the bankruptcy courts. One of the most important things we found in making our investigation was that the general demand from customers in this line of business had been steadily increasing during the period in which the sales of this particular concern had been decreasing. We also found by comparison with other concerns in the same line of business, that production costs and costs of materials from which its particular products were made had been decreasing for the five or six years prior to the date of our examination; whereas in this particular company production costs had been increasing. We found that the percentage to sales of administration and marketing expenses for companies whose activities and products exactly paralleled those of this company was about 12%, whereas in this company the cost of marketing and administration was about 30% of net sales. This was the picture we gave the banker with the recommendation that if the company wished to avoid bankruptcy it would be necessary to revise the expenditures for organization and production to more nearly conform to the income now being received.

The executives in charge of the company's operations were descendants of the original founders, were not trained business executives, and were men of poor ability and in addition thereto

were quite old and had not the incentive of the younger men to try to learn modern methods in order to place the business on a paying basis. As a result of our report to the bankers it was arranged that the activities of the company be administered by a representative appointed by the bank. This was done, and the first thing in the process of reorganization was to establish a sales quota for the coming six months by individual items of product. An analysis was then made of the inventory to ascertain which of the products forecasted in the sales quota were on hand and in what quantities. As soon as this information was obtained the production program was revised to the extent that a large portion of the manufacturing force was discharged, leaving only a skeleton organization. The purchasing program was reduced to the point where only materials that were actually needed to maintain the limited production were purchased. A new sales force was organized and a scientific study was made to ascertain the customers' demand for the particular products manufactured by this company. A sales conference was held and at this conference an estimate was made of the amount of business the new sales force should obtain during the next six months. This estimate was used as a basis for establishing a new production program. Administration and selling costs were reduced to an operating minimum. An amount had been established on the basis of the prospective sales quota as to how much the company could afford to spend at the rate of 15% on sales for administration and selling. In order to do this it was necessary for the new administration to move out of the expensive offices in the city and transfer the seat of administration to the factory. The offices were sublet at a profit. The net result of the combined endeavors of the new administration was to bring the administration costs down to approximately the percentage estimated on the basis of sales. The result of the new and more intelligent sales activities was to increase, during the next six months, the volume of sales to an extent that the quota was exceeded and it was necessary to increase the production and purchasing programs above those originally planned. It is surprising to know that for the second six months after the new administration obtained control, the total sales volume was about 10% more than the anticipated quota. The cost of produc-

tion. by averaging the units, was reduced by about 30% and the cost of administration was only 3% above the amount fixed by the percentage to sales. At the end of the year another report was submitted to the bankers and at that time the company had liquidated sufficient of its inventory to pay off some of its obligations to the banks. The banker, of course, was considerably encouraged and extended the company further time on the remaining notes.

This took place several years ago and at the present time the company is on a profitable operating basis, having only a normal amount of outstanding notes payable, is operating efficiently in all its departments and I might say that in the past two years the company has made such satisfactory earnings that it is on a dividend paying basis once again.

This might seem to you to be only the difference between good management and poor management, good sales effort and poor sales effort. However, that is just the difference between a concern which budgets its operations and one which does not. It is my belief that the real success which was obtained in pulling this chestnut out of the fire was based entirely upon the executive action obtained through correlating the activities of the several departments of the business and using executive action to see that this correlation was made effective. I might add, in commenting on this particular case, that the company operated a fairly elaborate detailed cost accounting system and a good planning system for its production. The figures which were being obtained from the cost accounting system were not being used intelligently and production was being planned without reference to sales or inventory balances.

In obtaining the proper relation of one activity to another in the particular business the new administration did not use the word "budgeting" in describing the methods used in obtaining the results, but it was "budgeting" just the same and good "budgeting" at that.

In describing the results obtained from budgetary control in this particular case I am unable, because of professional ethics, to disclose the name of my client. However, I assure you that it is a bona fide case wherein the results of the application of budget-

ary methods can be given a major portion of the credit for the successful results obtained.

In my next illustration of where budgetary methods have aided management in procuring successful results in coordinating the activities of an industry, I am able to give you the name of the company through permission of its president. I know of no other company in the metal-cutting industry which has spent so much time and effort to perfect a complete system of budgetary control that would be of practical aid to the management. The Walworth Company, of which Mr. Howard Coonley is president and at whose instigation the budgetary control methods were originally installed, is an old New England institution, organized some fifty or sixty years ago, and operated successfully until about 1910 or 1911. It has been my good fortune to be associated in a professional way with the Walworth Company's organization for the past seven or eight years. It is during this period that budgetary methods were installed, and I have been able personally to observe the results which have been obtained therefrom.

In 1913 this company operated only one plant which was located in Massachusetts. From this plant, all products manufactured by the company were distributed to the trade which was located mostly in the eastern part of this country. For several years prior to that time sales averaged about $2,000,000 annually. At the present time the annual sales of this company will approximate $30,000,000. From 1913 to date the company has expanded tremendously, to the extent that it now has large manufacturing units in New England, the Middle West, the South and in Pennsylvania, and operates sales agencies in practically every large city throughout the United States. It also operates selling agencies and has territorial representatives throughout Europe, South America, India and Australia through which its products reach practically every market throughout the world where the particular product is required.

The company manufactures pipe fittings, valves, and tools for use of the pipe fitting industries. These are made from such raw materials as cast iron, malleable iron, brass and steel. A great multiplicity of products is manufactured, it being necessary that the company have on hand at all times 23,000 different finished

products. When thinking in terms of items to be manufactured this means many more units, as many of the products, such as valves, are assembled from ten or fifteen different parts.

The products of this company are used in major part by railroads, oil producers, shipbuilders, building trades, manufacturing plants, etc. Another feature of the demand for the product which affects the operating conditions of the company, its investment in inventories, etc., is that the greatest volume of products sold is used in repair work which requires quick delivery by the manufacturer and necessitates a far flung system of warehousing in order to locate the products at strategic points throughout the country for quick distribution to the trade.

In order properly to obtain a correct idea of the problems which the present management had to solve, you must take into consideration its tremendous growth in a short period. In speaking of these problems in a recent publication the president of the company outlines his most important problem as follows: "not the least of which has been the great question of coordination of production with sales and the provision of adequate finances to keep us liquid."

Before the present method of budgeting sales and production was installed, the company was accustomed to organize its production program on the basis of customers' orders received. In following such a program the company had to increase the number of hours of production in periods when the orders were received in large quantities and volume, either by hiring new help which had to be trained and was inefficient and unskilled, for a period at least, or had to reduce the production hours when the receipt of orders and volume decreased, and curtail manufacturing operations. It was uneconomical and the reason was that production programs were not based on sales anticipated for future periods. The result was that the factories were not giving regular employment to the workers, were not producing at the lowest possible cost, and were not obtaining the expected gross profits on the goods manufactured.

The present management recognized this weakness and began to study the situation in an attempt to see what could possibly be done in order properly to relate production programs to antici-

pated sales. Studies covering a long period of time were made. Of course, in making these studies the several markets for the product and the buying capacity of such markets were ascertained. Statistics were also collected which furnished information relative to the quantities of each individual product which has been sold for the past several years. The results of these studies were very satisfactory, especially the studies of the activities of businesses upon which the sale of this company's product depended. In obtaining this information, statistics were perused relative to the general activities of these particular businesses, to the extent that seasonal trends and cycles of activity were definitely established over a long period of time. The information which I am giving you has been obtained directly from the files of the company and from conversing with its executives and the head of its statistical department, who operates the budgetary procedure. One of the principal results which the company wished to obtained from its first study was increased efficiency in service to its customers. In order to obtain such increased efficiency, it was necessary to ascertain what products were mostly used by customers and to place them in stock at convenient locations ready for quick delivery. The study disclosed that out of the 23,000 items only 600 could be considered as fast moving; in fact this small number of items covered about two-thirds of the total volume of products manufactured. The other third, as you may assume, was made up mostly of slow moving items.

The several studies relative to establishing sales statistics on which to base future estimates and quotas disclosed that the business was what might be termed a staple "bread and butter" business and that a normal continuous flow of sales could be anticipated. It was ascertained that it would be advisable and more practical to measure sales and production by tons rather than in quantities of each product sold. This gave the administration a definite unit of measurement with which to measure its sales and arrange its production programs. It was also found possible and practical to break the sales down into several large groups such as cast iron products, brass products, malleable iron products, tools, etc. These in turn were further broken down into smaller groupings. This not only provided an easy grouping for com-

paring sales with production estimates but also furnished excellent units of measurement for the cost accounting procedures inasmuch as the cost per ton of manufacturing each group could be furnished the executives in comparison with the selling price per ton per group. However, in relating the sales of the company to the sales of the businesses on which the company depended for its volume it was necessary to make the comparison in dollars.

In gathering the statistics for ascertaining or estimating what the sales of a future period would be in order properly to plan its production and control inventories, the company referred to Government statistics and figures compiled by the Harvard Bureau of Research and obtained the variations in the total volume of operations of sixteen relatively different businesses. The statistics obtained from each individual source were plotted separately and compared with the statistics plotted from the other sources and it was found that they compared favorably. They were then all thrown together and plotted in comparison with the actual sales experience of the Walworth Company for the same periods. It was found that the curves of both the sales of the sixteen companies and those of the Walworth Company compared favorably; in fact they were almost identical. The curves thus established covered a period of sixty months which was sufficient to establish the variations of the business cycle which applied directly to the activities of this particular company. This statistical information is now recorded periodically by the statistical department of the company and the curves established thereby are extended and brought up to date and are up to date at all times.

In establishing the sales quotas for a definite period the statistical department compares the curve thus established with the estimates made by executives of the sales department which are obtained from territorial and branch managers.

In addition to establishing the business cycle curve for the company as a whole the statistical department establishes a curve for each territory which purports to show the variation in demands for the company's product by territories and indicates that a definite amount of business can be obtained from a certain territory during a coming period. The estimates of the sales department for each territory are compared with this statistical curve and after general executive discussion a sales quota is established for each

territory. To illustrate how executive control is obtained of the territorial quotas, I will describe what took place recently in one of the larger sales territories of the company. It was anticipated that a certain amount of business should be obtained from the particular territory and inventories and production were planned accordingly. Only 60% of the expected sales were actually obtained. Investigation by company executives disclosed poor selling endeavor and poor organization in this particular territory and executive action was taken to the extent that the local agent was removed and a new one put in his place. Since this change has been made the sales performance has been more than satisfactory and it is interesting to note that it compared favorably with the pre-determined curve for the territory.

After establishing the sales quotas in accordance with the procedures which I have previously outlined, authorization is made to establish a definite production program for so many tons of product. Experience has established the fact that whereas sales quotas are established in tons for groups of product, it has been the experience of the company that for a certain amount of tonnage certain quantities of specific items will be required.

The foregoing will give you a general idea of the detail covered and the steps taken to establish the sales quotas of the company. There is a great deal of effort required by the company's staff to procure this statistical information and properly record it and it is impossible for me here to describe each step. However, I think I have briefly outlined the method used.

The forecasting of sales is the keynote of the company's planning. If the estimated demand as forecasted is in excess of the normal production of the factories, the inventory must be increased to care for this excess *before the demand is actually made.* It is also true that when the demand decreases the company must ship more than it produces *before the actual decrease in orders is felt* so that the inventory will be liquidated during the period of increased sales rather than during the period when depression actually takes place. Working on this basis the company has been able to establish its inventories at economic levels commensurate with good service to its customers and arrange its production programs so that it has obtained a regular flow of output and

thus great savings in cost have been obtained. It has also been noted that because of more regular employment a more satisfactory feeling has been created among the workmen.

Relative to the improvement which was obtained through budgetary methods in connection with building a more efficient manufacturing organization, Mr. Coonley stated in May, 1925:

"It is clear from the record that since 1921 an equal annual average of orders has been cared for by a lesser average number of employes and these employes who have been retained have been more definitely assured of a steady job. The worst of the peaks in rush production have been avoided. The threats of sharp curtailments, following periods of over-expansion, have been dissipated so the worker has been assured of steadier employment and has been happier and more efficient in his work. The company in turn has been assured of more continued use of the production facilities with a lesser expenditure for a quantity of production. Yet at no time has the customer been penalized by delays in shipment to the extent which he suffered in 1920."

Some of you are probably wondering what results have been obtained by the Walworth Company through applying budgetary control methods to its production departments. In speaking above of the application of budgetary control methods to the sales departments I stated that at a given point a definite production program was authorized. This authorization is given by a committee which establishes definite quotas by groups of product for each manufacturing unit. The committee is composed of the president, the head of the statistical department, and representatives of the sales department who, in conference, definitely and finally establish the quotas which they wish to obtain from the production departments during a specific quarter. This estimate always takes into consideration the tonnage of each group on hand in the inventories. Of course there is also an annual estimate of production made at the beginning of each year. The quarterly estimate is a revision of the annual estimate. The correction of the original estimate is always made in the light of present knowledge and experience. As these revisions are made the programs for purchasing raw materials are adjusted and the production schedule is rearranged.

These production quotas are furnished to the managers at each of the manufacturing units. The manager in turn arranges his production program by individual product classifications as well as by individual items of product. These are furnished to the department heads throughout each factory. In connection with furnishing the quotas to the plants I wish to say further that the executive committee, which determines the total of the quotas by production classes, also fixes the extent to which the personnel at each of the works should be increased or decreased in order to carry out the production program. The limitation upon personnel requirements is placed on totals only and is not so strictly enforced that shortage in production would result because of an attempt to live up to a predetermined personnel figure.

When the quarterly quota is received by the works it is the function of the works manager to arrange his production program and it is within his province to arrange to manufacture product in any portion of the quarter that will obtain the most economical results. The plant manager breaks down the quotas for the quarter into monthly quotas and into quotas for each department and at the beginning of each month he furnishes each department head with the month's quota for the particular department. A comparison of actual production against quota requiremetns is made for each department.

At each works there is a house organ in which a comparative tabulation of actual production against quota requirements is made. In addition to this comparison there is also presented a comparison by departments of the actual number of personnel used in obtaining the production compared with the authorized number of personnel. There is also a third comparison made, showing the net efficiency in view of both actual production and actual personnel. Mr. Barber, head of the statistical department of the company, in one of his reports states as follows:

"For instance, a 20% increase over production quotas secured by 96% of the authorized personnel would represent an efficiency against quota of 125%. Thus it is seen that the statistical control, establishment of quotas and check-up of actual performance against quota, is carried up to the control committee from the

individual sales unit and brought down to the individual department in the individual purchasing unit."

In working out the budget system, both in the sales and production departments, it has been found that in many cases sales have been underestimated. This is not usually the fault of the poor estimate but because of it. As the estimate has anticipated a certain condition and because of the knowledge of future happenings based upon the estimate, the sales department has increased its effort and obtained better results than the estimate which in all probability would not have been the case if the estimate had not been made. Because of the increased sales caused by additional effort of the sales department the production department in many instances, although meeting its quotas, does not furnish sufficient materials to meet the actual sales performance. This, however, is usually cared for by the safety cushion at which the inventory is maintained and in the next quarter the production program is arranged to care for the deficiency obtained in the previous quarter.

I wish to give as a final illustration a result which was obtained by the company primarily from its absolute control of operations through its perfected budgetary procedures.

During the year 1925 the company reorganized to the extent of acquiring several large manufacturing units and expanded its selling fields by acquiring several branch houses on the Pacific coast. Through the acquisition of these selling units and manufacturing plants the company acquired much duplication in its inventory and it became a serious problem properly to liquidate the excess thus acquired without seriously interrupting the production programs and bringing about a disorganized personnel. The coordination of the activities of the several new units and the absorbing and reorganizing of the organizations of the units thus acquired and merging them with the Walworth organization was an expensive job which required much time and forethought. The forecast as reflected in the budget anticipated a reduction in general income of the company from operations. To offset this the president, after conference with the head of the statistical department, in a revision of the budget, decided that it might be possible to reduce annual costs of manufacturing, marketing and administra-

tion by $1,000,000. A comparison of the cost allowances established by the budget was made with the actual expenditures as disclosed by a highly developed cost system. This disclosed the necessary comparisons to the extent that the president issued his instructions to department heads to make definite reductions in cost without impairing operations. Within three months of the time the instructions were issued, the reduction had been effected.

This example, which actually took place within the last eight months, establishes, in my opinion, the effective control which an executive of a large organization can obtain through the use of properly forecasting the activities of all departments of his business and relating their activities one to the other and by taking proper account of outside influences.

From a small business with poor sales, antiquated production methods and poor organization, the present administration has made the Walworth Company the second largest concern in its line of business and it is my opinion and that of the executives that the present success of the company is due in large measure to the practical application of budgetary control methods.

I know that I have been unable to go very deeply into the relation of fixed quotas to actual performance. I know that many of you who are interested in cost finding procedure would like to hear something relative to comparison of pre-determined cost quotas with the actual cost obtained. The Walworth Company and many other companies with which I have contact do this monthly in connection with the operation of the production budgets and it is of unestimable value to executives of the production department in controlling variable production costs, such as miscellaneous items of overhead expense, which give you cost men the most trouble.

I hope that in this somewhat rambling talk I have been able to bring out the importance of correlating the activities of one department of the business with those of all the other departments and, as well, to outside influences. This is particularly important to the success of the business which operates on a large scale.

Economic Considerations Affecting Commercial Budgets

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EDITORIAL DEPARTMENT NOTE

The budget, like a new nostrum, has sometimes been looked upon as a panacea for the ills of business. Enthusiasm in the use of a new tool oftentimes blunts one's appreciations of any defects which it may possess. With this thought in mind, the author in the paper presented herein, examines the budget system somewhat from the standpoint of its limitations.

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This paper was delivered before a recent meeting of the Philadelphia Chapter, N. A. C. A.

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ECONOMIC CONSIDERATIONS AFFECTING COMMERCIAL BUDGETS

WHEN your directors invited me to come to Philadelphia and talk on the subject of budgets, I was on the point of declining because it seemed to me that the subject of budgets and budget preparation had been worn threadbare. But when I was permitted to use the topic as a peg upon which to hang other material, fully as important and closely related, I accepted.

I venture to say that there has been no other period more difficult for business men generally than the past eight years; no other period when less reliance could be safely placed on past experience; no other period when the velocity and extent of changing conditions were as marked. One of the characteristic faults of our American industry has been the tendency to depend either upon a formula or to exaggerate the importance of a mechanism. We have not been content to limit the application of mechanics to its legitimate sphere, but on the contrary we are prone to apply a rigid technological process to conditions where some other factor —psychology, for example—is a dominant or controlling force. If there is one truth which the philosophy of business should teach us, it is the truth that the only certainty in business is its positive uncertainty. The one changeless law is the rule that business is constantly changing.

If the foundation of the budget structure is the estimate of the volume of business that is anticipated during the ensuing period, it is clear that the estimate must be predicated upon something more substantial than hope. While we may properly expect our national income to increase over the years, we must remember that it fluctuates from year to year and that psychology plays an important role in the decision as to how much of that income shall be spent for the various things or services which are presented to the consumer. In addition, one must take into consideration the changes in the price level which will affect all calculations made in dollars as well as changes in the cost of credit. As an illustration, let us consider the total corporate income from sales of all industry for the years 1923, 1924, and 1925. The statistics of Net Income of the Bureau of Internal Revenue reveal the following fluctuation:

Income	from	sales	in	1923.....	100.00
"	"	"	"	1924.....	100.63
"	"	"	"	1925.....	112.49

Upswing ceased in spring of 1923; downswing lasted to fall of 1925; upswing to spring of 1926. Based upon experience of past seven years, rising cost of credit means present upswing will continue to spring 1929 but there may be a falling off in the summer. Since the war, we could depend upon improved business coming about one year after cost of credit began to move lower. This is followed by a downswing in building contracts and a fall in volume of manufactured goods.

Using the year 1923 as a base, the income from sales increased slightly in 1924 over 1923, but increased 12% in 1925 over 1923. But if we compare these results with similar results for the manufacturing group alone we discover the following condition:

Income	from	sales,	manufacturing	1923.....	100.00%
"	"	"	"	1924.....	95.44%
"	"	"	"	1925.....	105.93%

In other words, while there was a slight increase in 1924 over 1923 for industry as a whole, there was a decline of over 4% for the manufacturing group. Whereas industry as a whole increased almost 12% over 1923 in the year 1925, yet manufacturing increased only 5.93%.

Since consumers exercise free choice as to the manner in which they shall distribute their purchasing power among the commodities and services offered, it is clear that the preparation of proper sales budgets depends not on what last year's results were, nor on what our hopes for the future may be, but upon a multitude of factors, among which may be listed: (1) increase in population; (2) increase in national income; (3) cost of credit; (4) fluctuations in demand and supply; (5) increased use of consumer credit or installment selling; and (6) shifting in demand because of consumer psychology, either independent of or stimulated by advertising. Combined with these, we have fluctuations in the price level and changed relationships in the structure of business through vertical, horizontal, and circular integration.

The shift in demand may be illustrated by the table below which shows gross sales of sundry manufactured products by amounts

in hundred thousands and percentages using in each case the year 1923 as the base year. It will be noted that while the volume in 1924 was substantially lower in total than in 1923, yet food, beverages and tobacco, rubber, printing and publishing, stone, clay and glass moved distinctly against the general trend. In 1925, there was a general improvement, in some cases more pronounced than in others, but leather and leather products and the unclassified group moved against the trend.

TABLE I

Gross Sales of Manufactured Products by Amounts and Percentages
(in hundred thousands)

	1923	1924	1925
Food, beverage and tobacco	9,835	11,470	13.138
	100.00	116.62	133.60
Textiles	7,713	7,011	7,472
	100.00	90.88	96.87
Leather	1,564	1,479	1,469
	100.00	94.56	93.92
Rubber	1,061	1,103	1,422
	100.00	103.95	134.02
Lumber	2,864	2,723	2,802
	100.00	95.07	97.83
Paper	1,409	1,328	1,446
	100.00	94.18	102.62
Printing	1,522	1,662	1,735
	100.00	109.19	113.99
Chemicals	5,654	5,394	6,424
	100.00	95.40	113.61
Stone, clay, and glass	1,328	1,349	1,456
	100.00	101.58	109.64
Metals	15,963	15,353	17,473
	100.00	96.18	.109.45
All others	4,975	2,561	2,240
	100.00	51.47	45.02
Total	53,888	51,433	57,077
	100.00	95.44	105.93

This history of industry furnishes many illustrations of panaceas offered to business as remedies for various and sundry sorts of industrial ills. The north-west passage to prosperity has been sought at one time by one route and later by another. Those whose memories run back twenty years will recall the "efficiency"

movement and its complex system of beneficial improvement which would instantly produce a thriving business out of hopeless conditions. At least, that was the claim of its projectors who assumed the euphonious title of "Efficiency Engineers." Experts in the new art were the recipients of lucrative fees for their services and good hard dollars were expended freely by soft-headed executives for hokum of the most potent variety. This went on until the field attracted too many players whereupon the most nimble of the brood jumped into the new art of scientific management. Others dared not follow, for what reason I know not, but I can recall a dozen names commonly mentioned in the "efficient" era who were never heard of in the "scientific management" age.

The world-war brought about the early demise of most of the new scientists for it was during that period of cost-plus contracts and rising prices that overhead flourished and business was neither scientific nor well-managed. Consumer resistance shortly after the war—an event which relatively few foresaw, but which was nevertheless the logical consequence of an industrial spree—brought its aftermath of head-aches and remorse. The budget expert arrived on the scene and he is now receiving universal attention and will continue to enjoy favor until some other ingenious invention is contrived to harass the perplexed industrialist.

In saying this I do not mean that business may not be made more efficient nor that we have no need of skilled management nor that budgets are a wholly useless device. Quite the contrary. But I do wish to call attention to the fact that despite twenty years of efficiencying and scientific managing, we are scarcely more than sixty percent efficient. What I desire to emphasize is that the budget is simply a valuable tool, useful in its proper field of action but not more important than other factors, and in point of fact, less important than some. The ability to discover the trend or to take measures to overcome the disadvantages of conditions or to fully capitalize the advantages is more important than the machinery through which results are measured.

The tendency toward lower gross and net profits has been recognized but the details are not so well known. Table II shows the percentages of gross and net profit for all corporate industrial enterprises for the years 1923, 1924 and 1925. There are distinct

evidences of a radical decrease in general expenses in 1924 apparently in anticipation of the decline in volume. Whereas the difference between gross and net in the aggregate in 1923 was 17%, yet in 1924 it was only 12% thereby indicating a reduction in miscellaneous general expenses.

TABLE II

	Percentage of Gross Profit			Percentage of Net Profit		
	1923	1924	1925	1923	1924	1925
Aggregate	23.77	17.88	16.18	6.41	5.67	6.81
Agriculture and related industries	28.27	25.45	24.22	5.98	.89	2.83
Mining and quarrying	35.37	24.52	24.15	.82	.25	6.50
Manufacturing						
Food	21.29	17.09	16.80	4.15	3.99	3.60
Textiles	20.64	16.82	17.41	6.50	2.06	4.11
Leather	16.72	17.61	17.64	2.45	2.77	3.26
Rubber	25.12	25.43	23.87	2.40	3.81	8.98
Lumber	26.82	23.33	22.38	9.37	4.66	5.38
Paper	24.38	23.29	24.32	6.92	5.75	6.97
Printing	37.41	28.36	28.07	7.66	7.76	7.73
Chemicals	27.19	25.67	26.89	7.39	8.49	10.05
Stone, clay and glass	33.64	32.52	31.68	13.05	10.94	11.25
Metals	29.63	25.13	19.13	7.89	7.31	8.58
All others	29.71	27.86	28.01	8.44	6.52	7.06
Total	26.14	22.42	20.65	6.93	5.70	6.74
Construction	15.82	14.22	13.94	3.50	4.43	5.40
Transportation and public utilities	37.94	4.95	3.96	13.46	14.11	14.26
Trade	19.33	18.07	16.40	3.04	2.41	2.62
Professional and amusement	41.73	19.60	18.25	5.79	5.75	6.75
Finance and banking	5.19	1.59	2.06	11.14	12.40	13.97
Combinations	20.43	14.61	11.58	6.10	3.50	4.97

It is a coincidence worthy of note that the percentage which "cost of goods sold" bears to total receipts from all sources in the years 1924 and 1925 was identical. There was an increase in the average cost of goods sold for all manufacturing in each of the three years under reveiew. But when we turn to the item miscellaneous expenses and note the increase in the aggregate average for all industry and the significant increase in the manufacturing industries coupled with declining gross and net profits, we appear to come to the heart of our problem. Whatever savings may have accrued from mass production or technical improvement,

appear to be lost in an increase in overhead or cost of goods sold.* It should be borne in mind that during this period, mergers and consolidations were still going on, that presumably we were utilizing all the savings which are alleged to flow from such devices and that every effort was made to reduce overheads. Some of the individual increases are significantly larger than in 1923. Table III assembles the data in convenient form for analysis.

TABLE III

Percentage Which Each Bears to Total Receipts

	Cost of Goods Sold			Miscellaneous Expense		
	1923	1924	1925	1923	1924	1925
Aggregate	61.93	63.38	63.38	22.75	21.82	24.72
Agriculture and related industries	51.35	53.77	50.30	29.00	31.40	36.97
Mining and quarrying	54.67	57.09	54.18	24.94	23.32	25.84
Manufacturing						
Foods	76.75	79.67	81.19	14.49	12.24	12.89
Textiles	77.78	80.56	79.30	10.09	11.09	13.59
Leather	81.45	80.40	79.30	11.27	11.62	15.26
Rubber	73.56	72.88	72.95	17.04	16.33	14.62
Lumber	70.39	72.67	71.97	10.84	12.76	17.01
Paper	73.71	73.96	72.56	11.53	12.05	15.75
Printing	47.91	48.27	47.86	36.64	36.04	41.34
Chemicals	67.26	65.70	63.88	17.45	18.34	20.50
Stone, clay, and glass	64.50	64.78	65.16	14.02	15.55	18.85
Metals	67.53	70.99	72.10	18.76	14.89	15.87
All others	68.01	67.97	68.60	17.32	18.70	21.46
Total	70.68	72.84	73.05	16.17	14.98	16.71
Construction	68.12	65.72	63.96	20.68	21.39	27.09
Transportation and public utilities	6.94	8.49	5.77	59.64	56.02	65.99
Trade	78.14	78.98	79.27	14.83	14.76	16.86
Professional and amusement	27.20	25.93	26.38	53.71	55.07	60.67
Finance and banking	25.22	24.36	33.96	39.98	39.44	39.28
Combinations	60.77	66.26	63.55	22.51	20.23	26.01
Total						

One trend of increasing importance is the fact that in some industries an increasing proportion of total receipts is derived from sources other than gross sales. Table IV shows the percentage which gross sales bears to total receipts. It will be noted that in

*There is a tremendous non-preventable economic waste under free competition—controlled only through "regulation."

almost every instance this ratio is declining. This is another way of saying that an increasing proportion of revenue receipts is derived from sources other than primary income.

TABLE IV

Percentage Which Gross Sales Bears to Total Taxable Income

	1923	1924	1925
Aggregate	81.24	81.25	79.56
Agriculture and related industries	79.45	79.22	74.52
Mining and quarrying	78.78	81.61	78.33
Manufacturing			
Food	97.51	96.76	98.00
Textiles	98.01	97.38	96.71
Leather	97.81	98.01	96.94
Rubber	98.23	98.31	96.81
Lumber	96.19	96.00	94.36
Paper	97.48	97.25	96.87
Printing	76.55	76.63	75.92
Chemicals	92.37	91.37	90.78
Stone, clay and glass	97.20	97.30	96.84
Metals	95.97	96.11	91.25
All others	96.76	95.84	96.60
Total	95.70	95.26	93.70
Construction	80.92	79.94	77.91
Transportation and public utilities	11.19	13.44	9.74
Trade	96.86	97.05	95.67
Professional and amusement	46.68	45.53	44.64
Finance and banking	26.60	25.95	36.02
Combinations	76.68	80.87	75.12

In Table V I have re-arranged the data showing under the caption "Prosperity" the results of those corporations which produced a net profit. Under the heading "Adversity" are shown the results of corporations whose operations were in "red." The table includes only the manufacturing corporations.

First, let us note that slightly over sixty percent are prosperous, and that forty percent are utilizing capital and labor in producing losses. While the consuming class benefited by obtaining goods at less than the cost to produce, yet another group in society, the creditor class, which includes creditors on open account, banks, bondholders, stockholders, and partners, sustained losses equal to the advantages which the consumer group realized.

You will also note that the net profit on sales of the Prosperity

group continued to decline while the losses of the Adversity group increased with the exception of 1924.

One important factor is the increase in Other Income. In the case of the Prosperity group, the decline in Net Profit on Sales was largely offset by an increase in Other Income. In like manner, the net loss of the Adversity group was reduced by material items of Other Income.

The increase in Other Income is reflected in the increase in marketable securities and other working assets which followed the deflation of 1920-21. We can see clearly the beginnings of the immense cash reserves which American corporations began to create after the experience in 1920 of paying seven or eight per-cent for borrowed funds. It would seem as though all had resolved never again to be in debt to the banks. Time will not permit me to go into this phase of the situation—interesting though such an excursion would be—but suffice it to say that the policy which began in 1922 will ultimately result in many radical changes in the structure of American industry.

TABLE V

Manufacturing Corporations

(in hundred thousands)

	Prosperity			Adversity		
	1923	1924	1925	1923	1924	1925
Gross Sales	46,738	43,184	49,613	7,150	8,252	7,470
Cost of Sales ..	33,668	32,327	38,046	6,133	7,001	6,458
Gross Profit on Sales	13,070	10,857	11,567	1,017	1,251	1,012
Business Expenses						
Depletion, etc..	1,187	1,137	1,278	237	272	228
Miscellaneous ..	8,447	7,249	8,469	1,620	1,815	1,712
Total	9,634	8,386	9,747	1,857	2,087	1,940
Net Profit on Sales	3,436	2,471	1,820	(840)	(836)	(928)
Other Income ..	2,033	2,213	3,396	387	345	439
Total	5,469	4,684	5,216	(453)	(491)	(489)
Deductions from Income	889	816	834	223	298	195
Net Profits	4,580	3,868	4,382	(676)	(789)	(684)
Number of Corporations	53,795	51,342	54,137	31,404	35,461	34,537
Percentage	63.14	59.15	61.05	36.86	40.85	38.95

NOTE: Items in parentheses are losses.

The manufacturing group reveals by far the largest share of loss-producing concerns and this is the special department of industry in which our efficiency engineering, scientific management, and budgeting practice have been most active. In the year 1925, the losses in the manufacturing group amounted to $682,000,000, of which metals produced $201,000,000; textiles $114,000,000; food, beverage and tobacco, $91,000,000; and chemicals $82,000,000. In that year also, the manufacturing group produced 48½% of the total corporate profit. We might argue, of course, that if it had not been for standard practice methods our losses would have been greater and there is no evidence to show that this argument is not well founded.

The problem of loss is not new. Its solution was attempted in the last century by the organization of trusts. These were repugnant to public policy and brought forth the Sherman Anti-Trust Act. Later, the holding company form of organization was employed to bring together, in a form permitted by law, some of our largest producing units. In most instances the savings which were expected from these combinations did not materalize. More recently distribution mergers have been organized to parallel the production mergers. But mere combination dos not seem to offer the solution. They require a correspondingly higher degree of skill and ability on the part of management and these qualities are not common. The production mergers do seem to have reduced costs to the consumer and to have stabilized markets. What the distribution mergers will do remains to be seen.

It is evident that those charged with the preparation of a budget for a business in a highly competitive industry are not only concerned with the usual materials of purely local significance but they are in fact concerned with an interminable set of economic factors of national and international character. Our manufacturing is not in a satisfactory state when such a large number of corporations do not earn interest on the investment. The maintenance of a form of competition which shifts wealth from the losing producers to the consumers is not equitable.

The narrower margin of profit in industry has its counterpart in lower rates of return on investments in bonds, preferred stocks, and common stocks. But before one can assume that the lower

percentage of profit in industry is in fact an actual reduction, there must be a comparison of the purchasing power of the lesser number of dollars. Fluctuations in the purchasing power of budget dollars must be taken into consideration. Furthermore, these changes have their repercussion in endless forms. For example, decline in the dollar values of inventories as well as the decline in quantities of stocks carried is reflected in lower insurance costs to producers and in lower premium income of fire insurance companies. This is simply one illustration of the inter-action of economic forces which is so subtle as to escape the attention of the ordinary observer.

In spite of our giant combinations with their power to command the most talented executives and employees, with every form of mechanical device in factory and office—and I include budgets here—to aid them, the fact nevertheless remains that immense advantages still rest with the smaller concern. In 1925, the total corporate and individual business profit amounted to 11 billion, 310 millions, of which individual business produced three billion 700 millions, or 32 7/10 per cent. For standardized staples we shall probably continue to look to our large producing and distributing corporations.

In the returns of net income submitted by business undertakings for income tax purposes, we have the materials for preparing a national balance sheet and income account. More than this, it is possible to segregate the data with such refinement as to enable similar statements to be prepared for individual lines of activity. Unfortunately the Congress has not been made to realize the importance of appropriating funds sufficient to pay for the cost of assembling the data promptly and in detail. The published data are not detailed enough to serve any useful purpose and the results for 1926 are not yet available. In a few cases, manufacturers' associations are attempting to collect statistics, but these are not by any means complete. Such information should also show quantities as well as monetary amounts. The data would be valuable not only to competing concerns in the same line but also to those undertakings which supply goods as well as those which purchase. The correlation of external economic data with the facts of internal character is highly important and it is here that we are

least efficient. Such material would be of incalculable value in determining trends from which all producers and consumers would profit. A large part of the risk of industry would be removed if this information were available. The cost to secure it would be nominal when compared with the amount of loss that would be avoided.

Marvelous as has been our development during the past decade, in spite of the demonstrated inefficiency in our industry, the problems of the next decade are to be no less difficult of solution. It hardly seems possible that we shall have such a large export surplus as we have had when the rest of the world recovers completely from the dislocation of the world war.

There has been an intense increase in the industrialization of many countries in Europe and some of this exportable surplus must of necessity come into competition with us either in home or foreign markets. There seem to be sound grounds to support the view that we shall have an import surplus within the next decade. Evidently some change must be made to reduce the number of loss-producing industrial concerns as well as to reduce the monetary amounts of the losses. Whatever shift will be attempted is certain to affect all other concerns in the same field, and influence related industries as well. It will be evident upon reflection that commercial budgeting must take cognizance of all of these economic influences. The chief budget officer must measure up to his new responsibilities. He must in many instances be an internationalist in his point of view.

After all there is nothing equal to ability as a motive force in business. It is of all-embracing importance and transcends all analysis. I believe that it was Alice in Wonderland who said that we ought to get into the habit of believing one impossible thing a day to be true. And so if we use that habit of questioning what seems to us to be an obvious certainty, we are likely to be led into the discovery that certain things which we thought were necessary or natural or that had to be, are after all not necessary or natural or could profitably be changed.

It may seem heresy to appear here and not defend budgets to the last ditch as the summum bonum or greatest good: It is not so much that I do not believe in an intelligent forecast as it is that

I do not believe in over-stressing its special utility. More important it seems to me is the consideration of the cycle of production or the determination of the period, be it a year or more or less during which we may produce a given quantity of goods or services at a profit. The determination of the precise point at which under given conditions, profits cease and losses begin is the important objective. In an era of declining prices, the profit is safeguarded only by an increase in volume or lowered costs. Modern production essentially involves a continual increase in capital in the form of machinery which in turn involves large additional charges for interest. This element in cost increases rapidly with every decline in production. Only recently I came into contact with one case where a prominent American industry had lost its markets in France and Czechoslovakia because of German competition and its markets in Australia and Japan because of British competition. This is not an isolated case. I mention it merely to reinforce my main thesis which is, use a budget but do not get the notion that it is the only tool in the kit.

Foundry Costs

By
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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

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EDITORIAL DEPARTMENT NOTE

In every large industry one finds members who are in the forefront of all developments and others who trail along in varying degrees of progressiveness and strength. Probably nowhere is this condition better exemplified than in the foundry industry. Nowhere more than in a highly competitive industry is it necessary to have an accurate knowledge of costs. The sense of security and satisfaction arising from having a cost system, even though the cost figures which it develops are inaccurate, is a handicap hard to overcome.

The author of this paper, which was presented before a meeting of the Cleveland Chapter, N. A. C. A., is Mr. Albert E. Grover, whose wide experience in foundry work entitles him to speak with authority. Mr. Grover has had more than twenty years of cost accounting experience. He started with the Geneva Metal Wheel Co., Geneva, Ohio, in 1905. Seven years later he was employed by the firm of Nau, Rusk & Swearingen, Cleveland, certified public accountants. During eight years service with this firm he specialized in foundry systems. His professional contact with the Dunham Co., Berea, Ohio, secured for him the position of comptroller for that castings manufacturing establishment. In 1921 he returned to the professional field, being employed as cost manager by Kohr, Brubaker & Fisher, Cleveland, leaving a short time later to establish a cost accounting practice in his own name.

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FOUNDRY COSTS

PROBABLY no document in daily use by the foundryman excels in importance the estimate sheet. Upon it depends the whole fabric of a successful business career. A professor in economics once told his class that some manufacturers based their selling prices on estimates, while others established a sales price through the use of *guesstimates*. "Guesstimates," said he, "are only the wild vaporings of a credulous mind too often influenced by the price established by competition where the same methods are used." Estimates are supported by actual "cost data."

Three methods of making up estimates of cost are prevalent. Briefly they are as follows:

Starting with the average cost per pound of all castings produced, and adding or deducting *guesstimated* amounts to cover variations in cost from the average. This method would be sufficient if the foundryman was lucky enough to guess right at the start. There is only one factor in favor of this method. The cost of clerical help is *nil*. An example of such a method is shown in Table I.

TABLE I

TONNAGE COST ESTIMATE

Average cost per hundred pounds	$ 5.00
Weight of finished castings	2000
	$100.00
Added to cover excess cost	25.00
	$125.00
Freight Out 2,000 pounds at 0.06 per cwt.	1.20
	$126.20
Profit at 10 per cent	14.02
Sales price	$140.22

The second method bases the estimate on the average cost of castings of the same class as shown on cored castings weighing between 11 and 20 pounds cost $6.50 per hundred pounds. An example of such a method is shown in Table II. Not much can be

said in favor of this method as it does not comprehend the possible variations in coremaking, molding and cleaning. Neither does it have the advantage of low clerical expense as in the first method. The clerical expense is nearly as great as that required to secure cost data on individual jobs.

The third method is applied by basing the costs of the several operations, through which the castings will pass, upon actual cost data. An example of such a method is shown by Table III. A

TABLE II

CLASSIFIED COST ESTIMATE

Average cost per hundred pounds for this class	$ 6.50
Weight of finished castings	2000
	$130.00
Freight out 2,000 pounds at 0.06 per hundred lbs.	1.20
	$131.20
Profit at 10 per cent	14.57
Sale price	$145.77

TABLE III

INDIVIDUAL JOB COST ESTIMATE

		POUNDS	
100 castings, pattern X, weight—Mold		3,000	
—Gate and sprue		1,000	
—Good cast		2,000	
MELTING COST			
Metal at spout, 3,000 pounds at $1.60 per hundred-weight	$48.00		
Less—Gates and sprues, 1,000 pounds at $1.00 per hundred-weight	10.00		$ 38.00
CORE MAKING COSTS			
Material	3.00		
Labor, 10 hours at $0.70	7.00		
Expense, 10 hours at $1.50	15.00		25.00
MOLDING COST			
Labor, 20 hours at $0.90	18.00		
Expense, 20 hours at $1.75	35.00		53.00

CLEANING COST		
Milling, 2,000 pounds at $3.50 per 1,000 pounds	7.00	
Labor—Grind, 4 hours at $0.60	2.40	
Expense, 4 hours at $0.80	3.20	12.60
EXTRA		
Mount on plate—Material	4.00	
—Labor, 5 hours at $1.00	5.00	
Expense, 5 hours at $0.60	3.00	12.00
		$140.60
RETURNS		
Foundry 5% 5		
Customer 1% 1		
6 at $1.41.....	8.46	
Less—Remelt value, 120 pounds at $1.00 per 100 pounds	1.20	7.26
		$147.86
DISTRIBUTION COST		
Shipping 2 per cent	3.28	
Selling 8 per cent	13.15	16.43
		$164.29
PROFIT, 10 per cent		18.25
FREIGHT OUT, at $0.06 per hundred-weight		1.20
SALES PRICE		$183.74

comparison of the results of these three methods is convincing evidence of the unreliability of the first two.

To provide information for use in making estimates, certain accounts must be set up on the books of the company to measure operating activities. Provision also must be made for summing up or closing these accounts, so that such detailed costs as kept may be applied to the quantity of castings made. Any system of cost finding, whether based on average tonnage, classification, or individual jobs, must be tied in or proved with the general book

accounts recording investments in materials, labor and overhead expense, if accurate results are to be expected.

Two distinct types of buyers are doing business with the foundrymen. The one sends a print of the casting or perhaps the pattern to the foundryman asking for quotations on each separate job. The other brings in a collection of patterns covering a variety of weights and shapes, asking for a blanket price per hundred pounds covering all the patterns. The first type, by his action, admits he is shopping for a favorable price. The second conveys the idea that he is willing that the foundryman shall make profit enough on the easy job to compensate for loss on hard jobs.

Consider now how the foundryman operating the several bases of estimating previously mentioned will handle this situation and what results will follow.

First consider the man who favors the tonnage basis of estimate. In the case of the individual job quotation, he is dependent upon his own guess as to the variations from the average tonnage cost shown by his records. Surely he has made castings similar in weight and shape, but the accumulation of material, labor and expense cost separately for these castings, seemed an unnecessary expense. He must now take a long shot at a price and trust to luck in securing the business, or in some manner learn the quotation of his competitor. Here is the uneconomic phase of the situation. His competitor makes a price (and no one knows whether it is right or wrong), and the *guesstimator* promptly underbids him. Perhaps other foundrymen get into this bidding game until the price of the job has been reduced to a point where profit is impossible. Suppose he stands pat on a job where his guess is more than the actual cost to produce. He certainly will lose profit eventually through the loss of future business.

Now, what about the *Good Samaritan* who favors the buyer with an order for all his business. With this kind of a sales policy can he not enjoy life? Has he not saved the cost of a clerk and relieved himself of the annoyance of analyzing cost data?

While he slumbers on in blissful ignorance, a competitor slips into the picture like a thief in the night, and takes away certain profitable jobs. This competitor knows the cost to make each job, so the unprofitable jobs are not interesting to him and he leaves

them where they are. The tonnage price foundryman is apt to reason to himself somewhat as follows:

"Why should I worry? I can go into the field and bring in more jobs to replace those taken away. I shall have a good portion of the old customer's castings in the sand. Look at that heavy casting, it weighs 500 pounds and makes up for the loss of ten 50-pound castings that my competitor took away. Can anyone question my conclusions? Have I not been in business for so many years that my experience outweighs any conclusions that a mere cost clerk can secure from a cost system?"

Let us analyse this reasoning.

Assuming he has an order for 100 of the 500-pound castings, and the order for 50-pound castings, that he lost, called for 1,000 castings. Assuming further that the actual production cost is obtainable, the results of the transactions would be:

	500 *Pound Contract*	50 *Pound Contract*
Weight ordered	50,000	50,000
Price per 100	$ 6.00	$ 5.00
Cost per 100	8.00	4.00
Price received	3,000.00	2,500.00
Cost	4,000.00	2,000.00
	*$1,000.00	†$500.00

*Loss. †Profit.

Has he saved the expense of a clerk? The 500-pound casting is a difficult one to make, and he loses $1,000 on the order, in spite of the fact that his tonnage costs show a profit. If he loads his foundry with this job he soon will be out of business. His loss has been increased by giving away the profitable order for the 50-pound castings.

Consider next the foundryman who bases his estimates on classified castings costs. He has little advantage over the one using a flat tonnage basis.

Referring to Table II, the base for estimating is $6.50 per hundred pounds, which is the average cost for all cored castings between 11 and 20 pounds. Of the $6.50, the only part of the cost

that fluctuates relatively with the weight of the casting, is the cost of the iron at the spout amounting to $1.60 or approximately 25 per cent of the total cost. The actual cost of labor and expense to make this particular casting is considerably above the average for the class, as shown by the actual cost of $8.21 in Table III. It is not uncommon for a casting with a simple core to cost less than a plain casting of the same weight.

Results from such a system of data collection cannot be otherwise than misleading, as too great a chance is offered for fluctuation in labor and expense between jobs in the same class.

The direct labor for coremaking, molding and cleaning is the most expensive item of cost to obtain. To insure accurate classified costs, the labor must be accumulated by these classes. As men employed to perform these operations are changing from one class to another almost as often as the jobs change, the saving in timekeeping is not materially reduced from labor cost for individual jobs.

Knowledge is power, profitably may be written into the business ethics of the foundry industry. The foundryman who bases his estimates of cost on the accumulation of actual material, labor and overhead expense data for individual jobs certainly has the knowledge, which, coupled with good business sense, contributes toward establishing sales prices that are just to the consumer and profitable to the castings manufacturer.

It must be admitted that cost records of individual jobs require clerical effort and care must be exercised to eliminate the unnecessary expense in accumulation and distribution. There is a shortest way to secure individual job costs, and the foundryman does his organization a serious injustice if he does not try to find that way.

Before entering into a discussion of foundry cost methods, it would be well to have a common understanding of what costs are. My interpretation of the term cost, is that it is a measurement of investment and its application to the individual products manufactured. By investment we mean the amounts invested in the following items:

Raw Material
Direct Labor
Overhead Expense.

By raw material is meant all materials in the condition in which they were purchased—such as pig iron, coke, sand, lumber, etc. The control of material receipts and distributions to the product is extremely important, and for the purpose of recording movements of raw material I have used a form on which these movements are shown, both in quantity and value. Each separate kind of material has one of these forms or "Stores Record," thus exhibiting continuous information concerning:

Date received	Date used
Quantity received	Quantity used
Purchase cost	Value used
Transportation cost	Quantity on hand
Unit Cost	Value on hand

Fully 75% of the perpetual inventories I have seen carry only quantities. I have found, in nearly all cases, that it is very practical to carry the values right along with the quantities. If you are to have an operating statement at the close of the month it is essential to know the cost value of materials on hand at the close of that period. It is very little more work to compute and record the value of materials on hand, as credit entries are made to the stores record, than to be compelled to compute inventories at the close of the month. There is so much work of a clerical nature that cannot be done daily that it seems good economy to do all possible computations before the peak load at the close of the month.

I have always been guided by conditions at each plant in the selection of material items for perpetual inventory records. In every plant there are many items of insignificance that may well be charged directly to the expense account of the department affected. In other words, where is the economy in paying a dollar to record a ten cent purchase? However, it is important to know that the cost value of materials gets into the cost of the individual castings produced and that the value of materials on hand at the close of the month is correctly stated. We cannot hope to accomplish this without a check on the work of compiling costs, and this is most admirably accomplished by the use of the stores records.

The use of mechanical means for computing has been very effective in connection with the daily work of the foundry cost ac-

countant. There are numerous computing machines that do fine work, but for the particular needs of the foundry cost man I have had the most success with a large slide rule. Without these means of computing, I will say that the cost work of the foundry clerk is rather arduous. However, if the computing machine were not to be had, and the work had to be done wholly by hand, the results would many times more than pay for the effort.

I used to think, when I went into public accounting practice, that in order to start a perpetual inventory system I would have to shut down the plant, throw everything out the window, then take an inventory of all materials and open up stores cards at one time for all materials. I soon learned that there was a more effective method of getting the records started—by taking a few items at a time and teaching the clerks how to work them and gradually build onto the list until the entire inventory was under proper control.

Now, as to the overhead; its relation to the cost of castings is so important that it needs considerable analysis. As we divided costs into three elements, we can divide the overhead expense into the same number of elements or classes:

Building Expense
Equipment Expense
General Expense

Building expenses are those expenditures necessary to furnish a place for the men to work and are made up of:

Depreciation on Buildings
Taxes on Buildings
Insurance on Buildings
Interest on Investment in Buildings
Maintenance of Buildings
Heat and Light

Equipment expenses are those expenditures necessary to furnish the men with tools to work with and are made up of:

Depreciation on Equipment
Taxes on Equipment
Insurance on Equipment
Interest on Investment in Equipment
Maintenance of Equipment
Power and Air

General expenses are those expenditures necessary to furnish the men supervision and clerical effort necessary to plan and record their activities and all other expenditures, besides direct material and direct labor. These expenses are made up of:

Supervision	Salesmen's Salaries
Clerical	Salesmen's Expenses
Indirect Labor	Advertising
Supplies	Commissions
Accident Insurance	Bad Account Losses
Trucking	Miscellaneous
Telephone and Telegraph	

Every foundry is organized to make and sell castings and every expenditure made is either chargeable to making or distributing the castings to the customer. Some foundrymen are inclined to add a third classification known as administration expense. This only complicates a system of cost finding as these expenditures must be allocated to individual job costs somewhere, if a correct result is obtained. If these expenses are analyzed and charged with other operating expenses, to departments, the cost procedure is very much simplified and a correct result insured.

Every foundry has seven departments, each a separate function to perform, in making castings and distributing to customers, namely:

Melting	Pattern
Core Making	Shipping
Molding	Selling
Cleaning	

Those foundries such as steel, malleable, etc., that treat the castings for special use by the customer, use these same departments and add those necessary to measure the additional work.

Every item of overhead expense must first be departmentalized, then the expense accruing for each department distributed to the units of production flowing through the departments. The basis of distribution differs to conform with the varying activities of the departments, such as:

Melting on a weight basis
Core Making on a labor hours basis

Molding on a labor hours basis
Cleaning on a labor hours basis (Milling on weight basis)
Pattern on a labor hours basis
Shipping on a production cost basis
Selling on a production cost basis

Building expense was defined as the expense necessary to furnish a place for the men to work. Often a single building houses all the departments of the business. In that case the expenses of maintaining the building are divided between the departments on the basis of area, either square feet or cubic feet—I usually use the square foot area as a basis. In the case of a group of buildings, the procedure is the same except that valuations of the different buildings should be the factor in allocating expenses—first to the entire building, then to the departments in that building on the basis of floor area occupied by each. In this class of expense is one item, maintenance, that can be charged directly to departments, except where it affects a building housing more than one department. The total building expense for each department is included with the equipment and general expenses for distribution to the product flowing through the department.

There may be some question as to why I put Interest on Investment in costs. The question of interest on investment as a proper charge to costs has been "cussed" and discussed for years, with the result that a solution satisfactory to all has not, as yet, been reached. Interest on Investment, to my mind, means this: If you have a hundred thousand dollars invested in a building for the purpose of foundry operations, you will first have to make a profit equal to an amount you could get for the use of the money if you invested it in something that required no effort before you can realize a profit accruing from your foundry operations. Some foundrymen are deducting interest on investment from their gross profit when they make up their monthly operating statement. This method is ineffective because it does not provide for the inclusion in costs of individual units of production and, therefore, does not get into the estimate for making selling prices. Costs are the bases for establishing all selling prices, although many foundrymen insist that they must sell their castings in a competitive market. *It may not be your cost or my cost but it is someone's cost which makes the*

selling price. Now, if interest on investment in facilities to make one casting is greater than another, which is nearly always true, then the cost of each casting must bear its proportion of the interest on investment if it is to get into the selling price and be paid, indirectly, by your customers to your stockholders.

The fixed charges (depreciation, taxes, insurance and interest) for equipment expense are analyzed and distributed to departments in a manner similar to that just described for building expense, using equipment values as a basis of distribution instead of floor area.

Maintenance charges are made direct to departments.

Power and air are charged to the departments on the basis of actual consumption.

It has always been troublesome to many foundrymen to get the cost of supervision and clerical effort properly charged to costs. I doubt if there is anyone who can allocate the time of the superintendent or the clerks and bookkeepers to individual jobs. For this reason I have known many foundrymen to say that costs cannot be had. There is a way to departmentalize these costs so that the individual units of production will be charged with their proper share of expenditures for supervision and clerical. The superintendent supervises the activities of the men in the plant, and the hours the men are at work represent the activities of the departments. The distribution of the superintendent's salary would, therefore, be practical on that basis.

Foremen's salaries can be largely charged direct to the departments where they work.

The cost of clerical effort is first divided between production, selling and shipping—on the basis of the service rendered each. The amount chargeable to production is then distributed to producing departments on the basis of man hours. Analysis of activities of the various individuals working in the office will reveal a very practical separation for cost purposes.

Analysis of the remaining items of expense will reveal the department to which they should be charged.

An all too common method of charging overhead expense to individual job costs is to divide the total expense for all departments in the foundry by the labor for molding and core making, resulting in a rate per dollar of labor. In figuring the cost of individual

jobs, the molding and core making labor is multiplied by this rate and the result added to the cost for overhead expense. This method does not even approach accuracy and its use is only misleading. This is particularly true in those foundries where there are both piece-work and day-work jobs in the sand at the same time. For example, a core maker earning five dollars a day on piece-work would not use up twice as much equipment expense or supervision and clerical effort as a core maker earning two and one-half dollars a day, nor would he use the facilities of the molding department in the same ratio. In fact, he would not use the facilities of the molding department at all. However, the use of the blanket expense rate, before mentioned, writes into the cost of the job paying the five dollar a day labor amount, twice as much as the one paying two dollars and a half, and both jobs are charged with expenses not caused by their activities.

That I may give a general idea of the method of accumulating and distributing the various elements of cost to individual jobs, I will use as an example a method designed for a small jobbing foundry producing grey iron. Do not be misled in thinking this is a uniform system that will work, in exact detail, in any foundry. It will not; but the principles of cost accounting reflected in its operation can be applied to any foundry activities, if properly applied.

In the small jobbing foundry where castings are molded today, cleaned tomorrow and delivered the next day after cleaning, it is many times imperative to have the cost of individual jobs daily, so that sales invoices can be made promptly and operating profits determined as soon as the jobs are completed. This daily procedure may seem like much additional effort over monthly compilations. However, actual experience has demonstrated that the small extra effort is more than offset by the benefits of getting costs while they mean something, and also to relieve the peak load at the close of the month, thus enabling the foundryman to close his books and take off his monthly operating statement before the fifth of the following month instead of the fifteenth, as most always happens with the monthly system. We must bear in mind that the multitude of small orders taken into the small jobbing foundry must be figured, and in the most cases it will take just as long to figure them at the close of the month as to do it daily.

A report of castings produced is made out daily by the cleaning and inspection department, showing the pattern numbers, and pieces and weights of good castings produced for each pattern. The defective castings, found in the foundry, are likewise reported on this schedule, for each job. This sheet is also provided with columns to record:

Metal Cost
Core Cost
Molding Cost
Milling Cost
Cleaning Cost
Extra Cost (Pattern, Flask, etc.)
Total Cost
Date Shipped
Sales Order No.
Cost per Hundred Weight

The cost of metal at the spout is computed for each day's heat, and distributed to individual jobs, on the basis of good castings weight. These results are entered in the "Metal Cost" column of the cost sheet. A daily cumulative record is kept of quantities and values of raw materials (Pig, Scrap, Coke, etc.) used in melting, and these quantities credited to the "Stores Records" maintained for these materials. To the cost of metals used is added the labor and overhead expense of the melting department to determine the cost at the spout. The following diagram shows the method:

Pig Iron
Scrap Iron—Purchased
—Remelt charged
Total
Less Remelt Produced
Net
Labor—Yard men and Cupola Tenders
Expense—Coke
—Department overhead

COST IN GOOD CASTINGS

Simultaneously with the delivery of the core boxes to the core department, a production time card is made, showing the pattern

number, kind of core and the number of cores ordered. The foreman of the core department assigns the job by filling in the employee's name or number on the time card. The employee registers the time beginning and the time stopping work on the core job, either mechanically or with a pencil, and reports the number of cores made on the same time card.

All core time cards are collected daily and the earnings computed and entered on the time cards. To the earnings is added the overhead expense chargeable to the job (based on production hours) and the material cost (based on the weight of sand mixture used). The total cost thus obtained is posted to the daily cost sheet (core cost column). If the cores were not all used in production of the molds that day, the cost sheet is charged with only the cost value of cores used and the remaining value noted on the time card. This remaining value is treated as work in process inventory until such time as molds are made requiring the use of the cores.

After entry to the cost sheets the time cards are filed by employee number until pay day computation, when the earnings are added and the total posted to the payroll. The time cards are then filed by pattern number for future reference.

I like to use the same time card for accumulating payroll data as I use for cost work, because if the workman understands that he is being paid from the job time card, he sees to it that the information on the card is intelligible and correct, which he does not if he rings on the ordinary "in and out" recorder at the door. The accumulation of all elements of cost on the time card tends to simplicity of operation and understanding, as a multiplicity of forms only confuses those who have to work on them.

The procedure for collecting and recording time and earnings for molding is similar to that for core making, except that no material costs enter into the cost of the molding operation as a direct charge to individual jobs. The cost of sand, parting, etc., is distributed to jobs through the overhead expense.

It often happens that there are two or more patterns molded in the same flask. In a case of this kind the pattern numbers are all shown on the same time card and the foreman or the molder states, from his own judgment, the percent of time that should be charged to each pattern. On this basis the earnings and expense are divided between the patterns. For many years I instructed my clerks to

divide the time on the basis of weight as I was afraid of the results of letting the men in the department make the division. There may be a more accurate way to get this information, but I frankly confess that I know no more practical one, and I would welcome information that would give me a better method.

The cost of labor and overhead expense for running the mill is charged to the cost of the castings milled on the basis of the weight milled. This is not true to real cost principles, yet experience has shown me that it approaches very closely to costs that would prevail if direct cost application were used. This cost is entered on the daily cost sheet.

There seems to be much discussion about the practicability of getting cleaning costs of individual castings. There are many castings that require more time to chip and grind than the combined time for core making and molding. Then why shy away from the facts, even if it does take a little effort to get correct information? If we expect to get back our expenditure for labor and overhead expense for cleaning, then we must see that a proper amount is included in the cost of the casting to cover this expenditure. There have been many short cuts used in trying to avoid the necessity of direct cost application of cleaning expense, yet I have not seen one demonstrated that even approached accuracy. There are perhaps two that are more commonly used than others. The one distributes to individual jobs on the basis of weight. The weight of the casting has no relation to the money spent in cleaning it, as a casting weighing a ton may be cleaned in an hour, whereas a casting weighing five hundred pounds may require a half day to chip and grind. The other method of charging cleaning cost in proportion to molding time seems to be more popular. However, an actual test of this method proves that it, also, is very unreliable.

Fully realizing that it requires some effort to collect the time for cleaning individual jobs, I record the cleaning time on a regular time and pay card for each job, allocate the expense of the cleaning department to it and post on the daily cost sheet. This method will stand the test; therefore, I have no hesitancy in recommending it.

Nearly every foundry has a department where they make and repair patterns, core boxes, flasks, bottom boards, etc. I believe that I am conservative when I say that fifty per cent of the foundries that I have known about, in the twenty years that I have been

in cost work, have seriously neglected the correct application of this class of expense. These foundrymen throw the entire cost of the department into the overhead expense of the molding department. That is a very sad condition. Some individual job is responsible for almost every dollar of such work, then why not put the pattern cost into the cost of the job that is responsible for the expenditure? It is understood that many flasks and bottom boards are more or less standard; therefore, can be used on many jobs. The cost of these can be capitalized and the depreciation charged through the overhead of the molding department. It must be distinctly understood that this procedure must be tempered with good, old-fashioned, common sense and a thorough understanding of the product.

I have had splendid success in getting costs for this class of work, by issuing production orders to the pattern department and having all material and labor turned in by the workmen, separately, for each order. The quantity of each kind of material used is credited to the stores record, thus obtaining an accurate purchase cost that is charged on the cost sheet for the production order. Sometimes this material is requisitioned from a stock room, although more times there is no stock room maintained for this class of material, the material being kept in the pattern shop. In the case of the requisitioned stock, the value is placed upon the requisition and posted from there to the pattern cost sheet. In the case of no stock room the pattern maker notes the quantities and kinds of materials used, on the back of the production order and the materials are priced and posted to cost, as in the case of requisitions. I have used several methods of collecting labor cost; some by the use of time cards for each individual production order, others by the pattern maker putting his time on the back of the production order. The method makes little difference as long as it conforms to the regular timekeeping method of the foundry, and is accurately recorded.

As already explained the overhead of the pattern shop is allocated to jobs in the pattern shop on the basis of labor hours. This item of cost is posted to the pattern cost sheets along with the material and labor costs.

In making out the pattern production order it is very important to determine the disposition of the total cost of the completed job.

In all cases, this information is noted on the cost copy of the pattern shop order, when it is delivered to the cost clerk.

In the operation of a small jobbing foundry, such as the one we are talking about, most of the patterns are furnished by the customer. There are occasions, however, when pattern repairs are made by the foundryman, and are charged back to the customer. A production order is made for these jobs and cost computed, for each job. The costs of these jobs are credited to foundry production and charged to customers accounts. Suppose this class of work should fall, as it does, into the foundry where no separate overhead expense is known for the pattern shop, how would it be possible to invoice such work with any degree of accuracy? The same procedure and results would apply to new patterns and core boxes made for the customer.

All pattern shop costs—except those charged back to customers —are charged, as nearly as possible, to the cost of individual jobs. In all cases the cost of this work is shown separately on the cost sheet, so that the foundryman can eliminate it in making future analyses.

All sales invoices are made in duplicate, the original mailed to the customer, and the duplicate copy retained in the cost department for accounting purposes. The date and sales order number are entered on the cost sheet, for each pattern number, and the cost is entered on the sales invoice copy. The costs, on the daily cost sheet, not transferred to the sales sheet, not transferred to the sales invoices, represent the finished castings inventory. This figure can be very quickly obtained by running an adding machine tape of the items on the cost sheets not shown shipped. In like manner, the cost of sales for the monthly closing can be determined by adding the costs of the patterns shipped, as shown by the dates entered to the cost sheets.

I have found it very profitable for the foundryman to be able to know his profit or loss on each shipment. This is accomplished almost automatically by this method, and immediately following shipment.

Now, we have before us the most important document in the foundry industry; the profit and loss statement.

PROFIT and LOSS STATEMENT
(Monthly)

Customers	Cost				Sales	Profit	
	Prod.	Ship.	Sell	Total		Amt.	%

I like to build up the profit and loss statement this way as it affords the foundryman an opportunity to get so much analytical information about his costs without a long drawn-out study of cost schedules.

As an illustration I have used customers as a profit classification, although other classifications that might be better fitted to the conditions of the foundry production can be used. In all cases I fit the system to the foundry instead of building the foundry around the system.

A cost system that does not "tie in" with and is not controlled by the financial accounting system is like a ship without a rudder. It is this control of the cost records through the accounting books that puts stability into foundry policies.

Up to this point my talk has been largely descriptive of how to get costs that are both accurate and simple. I wish to call your attention to a plan that I think will stabilize selling prices and at the same time furnish foundrymen with comparative data that will enable them to reduce waste in their plants.

COMPOSITE STATEMENT
Grey Iron Foundries

	Basis	Average	Lowest	Individual
MELTING				
Metal	Weight			
Labor	Weight			
Overhead Expense (melt. Dept.)	Weight			
Metal at the spout	Weight			
CORE MAKING				
Materials Sand Mixture	Weight			
Labor	Hour			
Overhead Expense	Hour			
MOLDING				
Labor	Hour			
Overhead Expense	Hour			
CLEANING				
Milling Labor Milled	Weight			
Milling Overhead Milled	Weight			
Total Milling Milled	Weight			
Grinding and Chipping Labor	Hour			
Grinding and Chipping Overhead	Hour			
PATTERN & FLASK				
Labor	Hour			
Overhead Expense	Hour			
SHIPPING Production	Cost			
SELLING Production	Cost			

I have been getting costs through the use of the methods that I have explained to you for over twenty years, yet the real benefits to be gained by comparing cost data among groups of foundries has only recently appealed to me. One of my clients, who operates a foundry in connection with the manufacture of an assembled product and does some jobbing castings work, said that he had been

discussing the cost of certain classes of castings with other foundrymen. This conversation took place on the first day of my service in his plant. Of course, he was deeply interested in foundry costs, as he was then negotiating with a very large manufacturer for an order running into a pleasing tonnage. He asked me what the average cost of twenty-pound cored castings was at that time. I told him that I did not know and if I did it would be a very dangerous matter for him to have the information, as he might be guided in making a selling price that would either write a loss into his books or lose the business. The twenty-pound castings that he was quoting on might cost five cents a pound and again it might cost twenty cents a pound—costs always depending upon the weight and shape, not on the weight alone.

This little incident set me to thinking and I went to work to formulate some plan whereby foundrymen could compare cost data and eliminate the misleading results of comparisons by weight only. The results of my study took definite form in the composite statement on page 1361.

My plan would be for a group of foundrymen to submit their monthly operating statements to some cost man who knows foundry costs to such a degree that he can apply true principles in a practical manner. The selection of this man should be made only after searching investigation has satisfied the group that his integrity is beyond question. The cost man would analyze the statements and make up a composite statement and mail a copy to each member of the group.

There is a selling price for each casting molded that is just to the purchaser and will pay a profit to the foundryman if his plant is run on an average basis of efficiency. The use of the "average" cost of a group of foundrymen, as shown on the composite statement, will furnish a splendid basis of computing cost estimates. In that way he is not putting his inefficiencies into his costs, but rather, he is using the average foundry conditions. If every foundryman would adhere to this plan there would be no drastic price-slashing among members of the industry. One foundryman recently informed me that there was no use for him to get costs as he was compelled to sell his castings on price only and that price was established by foundrymen who did not know their costs. I said to him, "Now, suppose every man in the industry took the same stand

that you do? Can you picture the chaotic condition the industry would be in? The industry is bad enough now with a few foundrymen actually knowing how to intelligently make a selling price." What a wonderful advantage this composite statement would be to him.

The proper establishment of a selling price is not the only advantage of using the composite statement. By showing the lowest operating costs obtained in the group, the individual foundryman is in a position to compare his own results with it, by operations. I know that any foundryman can find inefficiencies enough through its use to many times pay his investment in real cost records, if he intelligently corrects these inefficiencies. Many foundrymen think there is an approach to accuracy in foundry costs by combining certain elements and by so doing reduce clerical effort. This chart below displays the results of three different methods of computing costs that are in common use today.

COST COMPARISONS

	Weight		*Methods*			*Accurate Cost*
Pattern	*Lbs.*	*% Loss*	*A*	*B*	*C*	*D*
A	90	3.0	$5.00	$4.00	$3.55	$4.90
B	86	4.2	5.00	3.39	3.50	4.20
C	105	1.3	5.00	3.62	3.28	5.30
D	160	4.0	5.00	4.63	4.58	5.10
E	340	6.3	5.00	3.32	3.11	3.50
F	548	18.4	5.00	3.25	3.18	4.00
G	103	....	5.00	3.43	3.42	4.30
H	134	4.1	5.00	3.00	2.87	3.60
J	966	11.1	5.00	11.36	12.13	10.30
K	75	....	5.00	3.00	2.74	2.87
L	28	3.2	5.00	5.55	5.66	5.80
M	47	1.6	5.00	5.50	5.55	4.80
N	150	....	5.00	4.50	4.02	4.20

COST COMPARISONS

	Weight		*Methods*			*Accurate Cost*
Pattern	*Lbs.*	*% Loss*	*A*	*B*	*C*	*D*
O	150	11.0	5.00	3.30	2.91	3.40
P	9	15.9	5.00	4.34	5.97	4.26
Q	10	5.0	5.00	5.30	4.70	4.90
R	5	13.5	5.00	3.10	2.85	3.10
S	4	2.0	5.00	6.61	5.10	6.90
T	22	4.0	5.00	4.40	3.87	4.20
U	27	2.0	5.00	4.92	5.25	5.25
V	140	....	5.00	4.16	3.95	3.50

In column "D" of this chart is shown the correct cost of several castings.

Column "A" is the resultant cost of dividing the entire operating cost by the weight of good castings produced.

Column "B" reflects an untrue result obtained by combining the overhead expense of the core and molding departments for cost distribution.

Column "C" shows the result of ignoring cleaning cost by individual castings, but charging the individual pattern costs on the basis of molding labor.

Compare the results of "A, B and C" with the correct cost shown in "D." What is your reaction? These are not hypothetical figures but were taken from actual operations.

I doubt seriously if any foundryman would save 10% on the cost of his clerical effort by employing the incorrect methods here shown. There is one thought I want to leave with you. A system that does not give you a correct cost is not worth the effort that is put into it, even though the cost to get such a result be only ten cents.

Depreciation Accounting in the Machine Tool Industry

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The National Association of Cost Accountants does not stand sponsor for views expressed by the writers of articles issued as Publications. The object of the Official Publications of the Association is to place before the members ideas which it is hoped may prove interesting and suggestive. The articles will cover a wide range of subjects and present many different viewpoints. It is not intended that they shall reflect the particular ideas of any individual or group. Constructive comments on any of the Publications will be welcome.

Additional copies of this Publication may be obtained from the office of the secretary. The price to members is twenty-five cents per copy and to non-members seventy-five cents per copy.

EDITORIAL DEPARTMENT NOTE

Depreciation is a much discussed subject. We hesitate to offer another paper on this subject but the constantly recurring interest in it indicates a good deal of lively current thinking about it. There is probably no line of business practice where a greater variety of procedure will be encountered. The treatment of the subject given by the author of this paper is significant because it is based on an actual survey of practices in an important industry out of which has grown a recommendation for uniform rates applicable to the detailed items of plant and equipment.

Mr. Thomas B. Frank was born in Nebraska but educated in Indiana where he completed the commercial course in High School, and attended business college. This training was later supplemented by a course in accounting taken through the La Salle Extension University. During the war he served as chief of the Finance division of the Quartermaster's office, Fort Morgan, Alabama. Upon return from the army, he spent several years in public accounting work in Cincinnati, and with Lybrand, Ross Bros. & Montgomery, New York. In 1922 he started his career with the Cincinnati Planer Co. as auditor. In January, 1924, he was elected treasurer and director of that company, which position he still holds. He is also auditor of the Greaves-Klusman Tool Co. and a member of the cost committee of the National Machine Tool Builders' Association and secretary of the Engine Lathe Manufacturers' Cost Committee. He is completing his term of office as president of the Cincinnati Chapter, National Association of Cost Accountants.

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DEPRECIATION ACCOUNTING IN THE MACHINE TOOL INDUSTRY

Depreciation Practices

A SURVEY made by the Accountants of the Engine Lathe Builders and by the National Machine Tool Builders' Cost Committee indicates that the rates of depreciation as recommended by the uniform accounting system adopted by the Association are not being used by a great number of machine tool builders. Many rates appearing upon the replies to the questionnaire* are much lower than the recommended rates. These concerns are not taking the rates that have been considered to be necessary by executives after considering *all* the elements of depreciation, such as obsolescence, ordinary wear and tear, probable life, etc. Some of the lower rates being used are no doubt due to the fact that the reporting concerns do not keep detailed classifications of their equipment upon their books. Their plant accounts contain a heterogeneous conglomeration of items. The average machinery account contains more than machine tools, motors and cranes, etc. Many of the items listed should be classified as shop equipment or even small tools and depreciated accordingly. The average rates used by these concerns probably are not set upon a basis that takes cognizance of the mixed content of their accounts. They are accordingly not getting into their cost figures the proper charge for depreciation on their facilities. This practice no doubt exists in most cases in such accounts as office fixtures and shop fixtures, no segregation being made for furniture and fixtures and mechanical equipment such as adding machines, typewriters, and items of special shop equipment of similar nature which are often carried in the shop fixture accounts. What the industry needs first, probably before standard depreciation rates can be developed on a sound basis, is a re-classification of fixed asset accounts. The immediate adoption of an equipment record to show all details pertaining to each item of equipment seems necessary. This should provide for

* Refers to a questionnaire on this subject sent to the industry by the Cost Accountants of the Engine Lathe Builders' Group of the National Machine Tool Builders' Association.

both cost prices and replacement values, together with depreciation schedules on each basis.

The question arises then as to what should be considered as the proper basis for depreciation charges for the industry. Whatever basis is adopted should be one that records *all* facts and considers and provides for all contingencies and for adequate allowances to take care of replacement of plant facilities when they are worn out or become valueless.

Mr. E. F. DuBrul, General Manager of the National Machine Tool Builders' Ass'n, in a recent communication to the members of the Association, says in part: "The U. S. Steel Corporation is generally considered to be one of our best managed business institutions. At its annual meeting on April 19, 1926, some stockholders asked Judge Gary why the corporation did not pay bigger dividends, in view of the large surplus it was holding. The *Iron Age* of April 22, 1926, carried an editorial on this subject, and the editors well say that the great corporation really does not make so much money as it seems to make. A certain proportion of the earnings is distributed as dividends, and the remainder is credited on the books to surplus, which is constantly accumulating. However, that surplus is accumulating in the accounts that are representative of the property of the corporation, and is not represented in liquid assets.

"At the 1926 yearly meeting, Judge Gary pointed out that since the present cost of plant replacement is several times the original cost, the depreciation amounts which were used on old cost are not enough to merely replace identical property, to say nothing of replacing old plants with more modern ones. The plowing-in is not really plowing-in under those circumstances. It is merely a misnomer for up-keep and replacement. We have the same situation in the machine tool industry, and until it is recognized by the executives and steps are taken to really distinguish between actual earnings and fictitious earnings created by monetary inflation and tax regulations, the machine tool industry will not be healthy in this particular. If the price does not cover all this actual depreciation, the stockholder is simply not securing the return which the books show and which the government taxes."

Depreciation on Replacement Values

The matter of determining the proper basis for depreciation computations has received an unusual amount of consideration during the last few years. Business men are gradually turning away from the old notion that a little "new thought" in this direction is not needed. They are coming to the realization that their old plant records, using costs of several years ago, are not of much value to them when they consider present-day problems. Let me cite an example which I hope will bring out the point that I wish to make. Take a concern that has been in existence for a number of years, say since 1905, and has depreciated its machinery at the average rate of 10%. It is very evident that this company will have a great number of machines on hand and still in use that are fully depreciated. Of course, there are many concerns that have been gradually replacing their equipment and no doubt will not have many of these old 1905 machines in actual operation at the present time. But even so, all such replacements made up to the year 1917 are now fully depreciated. Many machine tool plants have not done much replacing since the year 1920. It will therefore be seen that they are not getting into their costs any charge for the use of this old equipment. On equipment installed during the last five or six years they would have a heavy depreciation charge to take into their costs. They would actually take this into consideration when setting selling prices as the computations would actually show on their books. The mere fact that a shop is operating with a lot of fully depreciated equipment on a cost basis should not govern their accounting for cost of product. If they ride along thinking that their costs are low on account of a low depreciation charge, they are inviting trouble for themselves as well as for the entire industry.

A shop may have in its equipment a planer costing $25,000 which was purchased in the year 1916. It has been depreciated at the rate of 10%. It was therefore fully depreciated in the year 1926 —or in the year 1925, if a proper salvage value had been provided for. For the year 1927 there would be no charge to cost for depreciation on this machine even though it was in use every working hour of the year 1927. It is obvious that the cost figures of the articles planed on this machine would not be a true cost and

therefore could not be used in computing a correct selling price, if such selling price was based on the true cost as it should be. The depreciation charge to work done on this machine this year is therefore inadequate.

Depreciation is charged off for the purpose of providing upon the books an allowance or reserve for the purpose of replacing the plant facilities when they are worn out or become obsolete—assuming, of course, that obsolescence has been considered in setting the depreciation rates. If the machine mentioned above, costing $25,000, was fully depreciated before the year 1927 the reserve for this machine would be $25,000—assuming that no salvage value had been provided. The management then decides that the machine is no longer serviceable or suitable for performing the quality of work that they expect of a machine of that type and go into the market for a similar machine. Assume that the price of a similar machine in the year 1927 is $31,500. It is obvious that insufficient cost has been charged over the useful life of the old machine to absorb this additional outlay of money, amounting to $6,500, which the management is now called upon to expend. Had sufficient depreciation been charged upon the replacement value of the machine during its assumed life, then the selling prices of the products manufactured would have been made to provide for the additional funds necessary to protect the plant when the period for replacement arrived. But it does not necessarily follow that selling prices must, or even may be increased to assure the necessary funds. Such additional funds can very often be got out of the plant itself by means of a careful analysis of all elements of cost and the cutting of costs in other classifications.

I know of one or two cases where the establishment of a policy of charging depreciation on replacement values so increased the book cost of the product that it was at first thought impractical to continue the manufacture of certain products. The people concerned were convinced of the soundness of replacement value depreciation and did not become discouraged nor condemn the practicability of the plan. Competition controlled the selling price to a great degree, so there was no hope for additional profit from that source. The executives of that business immediately started an intensive investigation which extended to all departments of the

business. The final result was that the manufacturing cost of their products is today on the same level that it was before the company computed depreciation on replacement values. The establishment of replacement values was of a distant benefit outside of itself, in that it stimulated cost reduction in other directions.

Consider the case of an executive who sets his selling price at a level with his competitors—and most of the machine tool manufacturers do that very thing, or think they do. Let us say that his costs reflect only a depreciation charge based upon the cost of old installations of equipment. In a good year such an executive will invariably think that he is making a good margin of profit. Then in a period of stiff competition or of dull business, he is too easily tempted to make low prices, under the delusion that his profit margin will be ample to take such cuts. This is not only harmful to the individual but to the entire industry.

If depreciation charges are computed upon replacement values, adequate charges will be made into cost at all times. Revaluation made by appraisal would keep the process moving until such a time as the equipment was scrapped or replaced. The executive will always have the current value upon his property and will have a cost figure that takes these current values into consideration. His balance sheet will always reflect present-day valuations on plant and equipment. The plant facilities when worn out will be represented on the books by a reserve that will be adequate to take care of the replacement. The charge for depreciation upon replacement values is an element of cost of production and there is no use for any one deluding himself with the idea that it does not exist, merely because the books reflect only values at costs of acquisition.

The executives and accountants who know this fact better, perhaps, than any others are the ones whose companies have built new plants and installed new equipment during the last few years. They have found that their depreciation costs are higher in proportion than they were in the old plant, because automatically their depreciation charges are based on replacement values.

In a paper entitled, "The Money Delusion in Depreciation Accounts," Mr. E. F. DuBrul says in part, "We all know that *all* costs, hidden or obvious, *must* be recovered with a profit if a business is to continue to live. We also know that *true* costs are very different,

quite frequently, from book cost figures. This is because bad accounting methods are often used in figuring costs. However, bad figuring does not change *facts*, and facts win out in the end, in spite of bad figuring that does not reflect *true* costs."

We all know that the company that distributes to its stockholders profits that are figured from records that reflect inadequate depreciation is placing itself in a precarious position. In the first place, it is probably not obtaining sufficient funds to provide for the ultimate replacement of its equipment, and in the second place it is surely distributing as earnings funds that are not in fact true earnings. Such distribution depletes the very cash reserves that should be built up for the continuance of the existence of the physical plant property.

According to the present methods of accounting for depreciation on the basis of cost only, the manufacturer who built and equipped his plant in a period of low prices thinks he has an advantage over the competitor who started business during a period of high prices. The manufacturer who thinks he has such advantage most generally does not try to pocket this advantage when he sets his selling prices, and causes or tends to bring about pricing practices within an industry that work to the distinct disadvantage of all within that industry. He is only causing trouble and will get the worst of the proposition when the cold facts show that he has been basing his policies on accounting methods that did not show true facts at all.

It is the actual replacement of the physical units of equipment that the business needs and not just the replacement of the dollars of the original investment. If the business were to be discontinued and if all the management is interested in were the return of their dollars, the idea of replacing dollars instead of physical units might hold true. However, a going business has more at interest. Its owners expect to continue business on the basis of the original investment and expect to have their total true cost of product returned to them, as well as a profit sufficient to pay dividends to stockholders and not impair the actual replacement of the physical units of plant when they are worn out or become valueless. If this additional margin is not provided for through costs, replacements can only be made from earnings, from additional investment,

or through the use of working capital that is needed for operating purposes.

Other items entering cost of product, such as materials, labor, insurance, taxes, etc., are current items and do not extend over a period of years. Their cost is fixed as it affects cost of production and is applicable to the current period only. Their price does not have the opportunity to fluctuate. When changes occur from time to time their increased or decreased cost gets into the cost accounts immediately and without question at what is approximately their replacement cost. A dollar paid for labor today applies today and has no bearing on what you pay for labor tomorrow. Equipment values, however, are much different. The value tied up in plant facilities is large and must be spread over a long period of time, during which time values may change considerably. It is this change of value that must be accounted for, for when the equipment is worn out it will have to be replaced with like equipment at a cost which may be quite different from the cost of acquisition of the original equipment being replaced.

The only safe and sure means to make provision for replacements is to carry depreciation at the known replacement value and not confuse such charges with special surplus accounts. Neither must it be considered a fact that any business management will always respect a special surplus allocation set aside for that purpose. The first contingency that arises usually sees such special surplus accounts used for other purposes. By getting the replacement depreciation into cost of product and having that cost returned by means of an ample selling price, seems to be the best and safest method.

No better illustration of the logic of this entire discussion can be found than to consider the practice of accounting for original cost only, in its relation to matters of insurance. Mr. H. G. Baldwin in his book, "Accounting for Value as Well as Cost of Fixed Assets," says: "If original cost is capital and if its recovery will prevent any impairment in the capital funds of the enterprise, why, in all reason, do we insure properties on the basis of CURRENT VALUES? Why add the additional cost of premium for the insurance of value to our already burdensome cost of production? If the principle of recovering only the loss of original cost of prop-

erty exhausted in production is sound, why is it not sound in recovering loss by fire and why is it not followed by accountancy and business? If the same principle of recovering only original cost was followed when insuring property, plants would be insured, when built, on the basis of their original cost, and subsequent loss realized through increase of values in the event of fire would be met out of surplus, or according to other ideas, new funds would be brought into the business to rebuild the plant. Loss of values involved could be ignored because the proprietors would have recovered their original investment and this, according to proponents of original cost, is all they can reasonably expect to recover; that if they do recover it, there will have been no impairment in the capital fund of the enterprise.

"How many of us would think for one minute of insuring our properties at original cost figures today? We expect, in case of fire or other loss, to recover the present-day value of the property destroyed. It is the present-day values with which we are most concerned. Our insurance premiums rise and fall as the values of our property fluctuate; that is based on the current values which we insure. If our loss is greater in actual value than the insurance carried, the underwriters liability is limited to the amount that *was* carried. If the economics of insurance were more universally understood, there would be less hesitancy over the adoption of a plan that would provide for the recovering of value of the loss of utility of property incurred through production."

Excess Idle Equipment

Another feature to be considered in establishing standard depreciation rates and practices is the treatment of excess idle equipment. Most shops today are equipped beyond the needs of any ordinary demand that may be made on those shops. In other words it takes a certain amount of equipment to take care of the normal demand, and any equipment in the shop in excess of that which is needed to take care of this normal demand would necessarily be excess idle equipment. In computing depreciation as a charge to current production of the shop on a normal basis, is it correct or good practice to charge into cost depreciation on such excess idle equipment? Most shops do that very thing. They

have all heard about excess capacity, but how many of them are giving this matter their serious consideration? In my opinion this excess idle equipment should be depreciated on the same basis as that equipment needed for normal production, but the normal production should not be burdened with such charges. The plant that is not over-built carries no such burden. Such proportion of the depreciation charge as pertains to excess idle equipment should be carried into a sub-account of profit and loss as a financial charge against the business. This will bring to the attention of the management true facts as to what this element of excess capacity is costing. Most concerns carry the excess idle equipment charges in the same manner as they do their regular idleness charges. In my opinion the two classes of idleness should be segregated and their costs accounted for separately. The depreciation of the excess idle plant should be segregated from the depreciation charged on necessary idleness of the normal plant, because that is the only way to get a proper accounting for each of these two very different sets of cost facts. Unless this method is used, true costs of product cannot be ascertained.

Through the courtesy of Mr. E. F. DuBrul, General Manager, National Machine Tool Builders' Association, there is here included a short treatise by him entitled "The Money Delusion in Depreciation Accounts" which discusses the essential economic basis of depreciation.

The Money Delusion in Depreciation Accounts

"One of the main functions of a cost sheet is to give the executive facts on which he can base a sound pricing policy. Another function is to show the executive whether the price at which he sold his goods has really given him a true profit. If the cost sheet does not show real facts, it merely misleads the executive on these two points.

"We know that all costs, hidden or obvious, must be recovered with a profit if a business is to continue alive. We know that true costs are very frequently quite different from cost figures, because bad accounting methods are often used in figuring costs. Bad figuring does not change facts, and facts win out in the end, in spite of bad figuring that does not reflect true facts.

"The executive who gets the truest statement of actual costs is in the best position to formulate successful policies that will recover all the costs in price, and at the same time, enable him to make the business truly profitable for his stockholders. There are more cases of under-estimating than over-estimating costs. Those executives who base their policies on a falsely low basis are almost certain to make prices that are unjustly low to their own stockholders, as well as to every competitor, no matter how well that competitor may know the actual facts.

"It is certain that to stay in business, any concern must collect enough dollars from its customers to replace the physical plant it consumes in production. If it does not collect and keep this amount, its stockholders' capital is impaired. Years ago, it was a common fallacy to neglect depreciation entirely as an element of cost, but most business concerns have now got out of that erroneous method of cost accounting. Figuring a rate that is too low to produce the required amount is only a trifle less erroneous. The executive must have a true measure of cost to go by, or he cannot make reasonable allowances in his prices for the replacements of property that the business is sure to need.

"The tax laws of the United States are based on accounting practice, which in turn is based on a false economic assumption of stability of values as expressed in dollars. We all know how false that assumption is. The tax laws and regulations prescribe that for tax purposes fixed assets must be taken at cost of acquisition, and depreciation must be calculated from that cost, in determining taxable income. The tax laws do not permit official records to reflect economic facts of appreciation, due to inflation.

"But economic laws are inexorable, and are superior to congressional laws. Whether the executive recognizes the economic facts or not, and whether the accountant records them or not, if executive policy does not square with economic facts, the business will head into economic failure. Therefore, it is desirable for the executive to provide records that will show him how many dollars his business must collect in price to cover the values being consumed, measured in purchasing power of present-day dollars.

"This policy is important at this time, because many plants have a mixture of assets acquired before the dollar got down to its pres-

ent low level in purchasing power. Current expenditures for labor, material and out-of-pocket expenses naturally are measured in dollars of current purchasing power. But interest and depreciation calculated solely from cost of acquisition of fixed assets bought before the inflation of prices, takes a dollar measure for those items of cost different from the one used for costs paid for in current funds. The method of measuring depreciation from present values is more important for the concern that has the older plant, than for the concern in the new plant. In the latter case, the records automatically show the replacement basis, because the plant has been bought entirely at present prices.

"The balance sheet, and loss and gain statement of the concern in the older plant, all by themselves, do not tell the stockholders what values they really own, nor what rate the business is truly earning on those real values.

"It appears certain that cost figures based on present values rather than on cost of acquisition would show costs of production to be considerably more than now appear on many cost sheets. If the actual facts were laid before all the executives of any industry, many would realize that their true present-day costs are materially higher than they now suspect. When he knew this, it would be a poor manager who would not make every effort to protect his stockholders' capital from impairment.

"To clarify the question, let us consider a concern needing a completely new plant bought at the present price levels, and figuring its depreciation and interest from present costs. The plant is built because it is reasonably expected to pay a profit over and above depreciation and interest so calculated. It cannot earn that amount unless its customers will pay a price that covers this depreciation. Its accountants have no hesitation in saying that such depreciation is a true cost in that new plant.

"Let us now suppose that this plant is an exact duplicate of one built before the war. The new structure would not have any more space in it, nor any more utility of any kind, than the old structure. Except for wear and tear on the old structure, there is no physical difference between them. But there is a big difference in the book figures that stand for these structures in the accounts.

"Now if costs are kept by departments, are charges for interest

and depreciation to be greater for the product made in the new building, than for product made in the older building? If one were to follow strictly the theory of accounting that requires depreciation and interest to be figured from cost of acquisition, that is exactly how they would appear. But any executive will say at once that the accounting theory that would bring out different costs and profits on the output of the two buildings is wrong somewhere.

"To produce something more sensible, the accountant would very likely average the depreciation and interest of both plants, and let it go at that. This is easy work for the accountant, and will stand the scrutiny of the tax laws. Yet, according to the accepted theory of depreciation from cost of acquisition, this averaging method overloads the costs in the older plant, and underloads those in the newer plant. Even so, this method does not give the executive a true accounting for all of the plant values being consumed. It does not tell the executive what he ought to know, that is, whether he is charging up enough dollars to replace these assets. It merely tells him if he is charging up as many dollars as the asset cost originally. But this is quite useless information if that number of dollars is not enough to replace the asset.

"To cover the costs of machine tools properly, allowance should also be made to take care of obsolescence and inadequacy, as well as wear and tear. Mechanical equipment in this industry becomes obsolete with marked rapidity. To make a machine tool function to the commercial degree of accuracy required, it must be constructed in a way that makes its physical wear very slow, even to the loss of commercial tolerance in production shops where the machines are under heavy service. Since the user's requirements for replacement of physical wear-out are very small indeed, such replacements are not frequent enough to make for much business. Spurred on by competition, the industry applies its inventive faculties to devising new machines of still greater productivity, which will have a selling appeal with users long before their equipment is physically worn out. This destroys the economic value of old equipment, and our industry lives and society progresses by this very destruction of plant values through obsolescence.

"Obsolescence is a very real cost, although admittedly difficult of accurate measurement. Like other costs, it is dangerous to

neglect. Merely to hold a place in the business world, a manufacturing concern must get money enough for its goods to buy better equipment than it had before, when the time comes for replacement. Therefore, cost calculations must include an ample allowance to cover that necessity.

"Another complication enters here, due to the present tax laws. When the property owner collects these costs from his customers, the tax laws levy taxes on them as a profit. To keep his stockholders' capital unimpaired, the executive must therefore collect an additional 13½% of the amount that the tax regulations would call excessive depreciation, and pay this over to the government as a tax on income.

"In every discussion of the subject that has appeared in print, it is a common thing for someone to say that the government does not allow a manufacturer to take depreciation from a replacement cost, but compels him to take it from his cost of acquisition. But we must remember that the government regulations apply only to accounting for income tax purposes. The tax laws are based on an accounting theory of profits, whereas economic profits are much less, in many cases, than the accounting profits which the tax laws create. The business executive must cut through the false assumptions that obscure or distort actual facts in his own case. The law does not forbid the executive from recognizing that the facts in his own case may be quite different from the law's assumption. Nor does the law forbid the executive from keeping such private records as will record the actual facts. It merely forbids him from recording those facts in the official books that the tax laws require him to keep. The executive has full liberty to keep and use any private record that will help him to run his business intelligently.

"It is easy enough to make up records that show the real facts. A disinterested appraisal is available in many cases, and is used for insurance purposes. Such an appraisal sets up the replacement cost new, and also shows how much of the value so measured has been consumed in use. The balance is sound value, protectable by insurance.

"If a calculation were made of the amount of interest and depreciation that should be charged currently to cost based on the replacement value, and this amount were compared to what has

been currently used, the executive could tell quickly whether his present cost sheets show him actual facts, or if they are deceptive. He could also tell if the business is earning a fair rate of return on the actual values of the capital employed. This would show whether his price structure squares with hard facts, or with illusions, based on inflated money."

The survey of the industry referred to at the beginning of this paper was made largely by means of a questionnaire, a copy of which, including the summarized replies, is given below. This is indicative of the variety of practices and conditions in the industry.

Questionnaire and Replies

Question 1.

In your cost accounting do you charge depreciation on plant and equipment to the burden account, or do you take it as a deduction from profit?

Replies:

Charged to Burden....50 Deduction from Profit....9

Question 2:

Do you figure depreciation charges on the straight line method, or do you use a diminishing rate method? If neither, describe method used.

Replies:

Straight Line Method	54
Diminishing rate	5
Other methods	3

The other methods used are: (1) Depreciation figured on hours used during year as compared to hours worked in year; (2) Straight line method except machinery where they use a particular per cent on each item; (3) Each major item or group has a rate.

Question 3:

In your cost accounting do you take depreciation from cost of acquisition or from replacement values?

Replies:

Cost of Acquisition.....58 Replacement values.....4

Question 4:

(a) Do you capitalize the cost of Dies, Jigs, Fixtures, Patterns, Drawings, Small Tools, Belting, and liquidate by depreciation?

(b) Do you charge the costs of these items direct to burden accounts?

Replies:

(A) Capitalize Cost of Items—
Dies .....31 members
Jigs .....37 "
Fixtures .....38 "
Patterns .....34 "
Drawings .....24 "
Small Tools ...16 "
Belting .....15 "

(B) Charge Cost to Burden—
Dies .....25 members
Jigs .....23 "
Fixtures .....22 "
Patterns .....29 "
Drawings .....38 "
Small Tools ...42 "
Belting .....45 "

Question 5:

Rates of Depreciation used?

Replies:

Buildings—
Concrete .....1½% to 7%
Brick .....1½% to 7%
Frame .....2 % to 10%

Machine Tools .....2½% to 25%

About fifty per cent of those replying use a rate of 10% or over which has been conceded to be a fair average rate for machine tools. The other fifty per cent use rates less than 10%.

Belting (in cases where capitalized) 4 % to 75 %
Dies " 5 % to 33⅓%

Jigs	"	5 % to 33⅓%
Fixtures	"	5 % to 33⅓%
Patterns	"	4 % to 50 %
Drawings	"	4 % to 50 %
Small Tools	"	5 % to 75 %
Automobile Trucks		15 % to 33⅓%
Passenger Cars		10 % to 30 %
Office Furniture and Fixtures		5 % to 20 %
Shop Furniture and Fixtures		5 % to 25 %
Hoists and Cranes		3 % to 15 %
Power House Equipment		2 % to 20 %
Railway Sidings		2 % to 10 %
Shafting		2 % to 40 %

Question 6:

Have you definite figures concerning the useful life of the above assets which could be used for the guidance of the committee?

Replies:

The few replies (11) received indicate that no scientific method has been used in determining probable physical or useful economic life. The following answers are typical:

"The depreciation rates used by our company represent our experience as to useful life."

"Have not kept permanent records showing useful life, but we estimate in general that machinery and small tools have a useful life of from fifteen to eighteen years."

The foregoing questionnaire revealed a multitude of depreciation practices and an amazing variety of rates. A large proportion of these rates was considered out of all proportion to what the industry as a whole is entitled to use, both for income tax purposes and for the industry's own cost finding purposes. Great numbers of the rates were too low to be consistent with even the actual conditions of wear, tear and usage, let alone being in line with actual conditions of obsolescence, usefulness and economic life.

The depreciation committee of the cost accountants of the industry makes the following recommended procedure:

The chart of plant accounts shown below has been drawn up to assure the industry of the correct depreciation deduction on all classes of assets used in the plant. Obviously if accounts contain many items of a widely different nature, the commonly used flat or average rate will not approach correctness in the depreciation figures.

The rates recommended are rates that will stand the test of the Income Tax laws and have been accepted by the Bureau of Internal Revenue in the settlement of a great number of tax cases. At the same time they are rates that will assure the industry adequate allowances for cost finding purposes.

Real Estate Improvements	*Life Yrs.*	*Rate Percent*
Roadways—Brick	8 to 10	10
Concrete	10	10
Macadam	6 to 7	15
Walks—Brick & Cement	10	10
Wood—Charge to Expense—Not Over	2	50
Fences and Walls—Iron and Wire	10	10
Wood or Wood and Wire, etc.	2-3	50 to 33⅓
Fences made of these materials are usually in bad shape before the end of the second year or so. Therefore it would be more proper to consider all such outlays as charges to expense immediately. In no case depreciate for more than 2 or 3 years.		
Railroad Trucks and Sidings	20 to 25	4 to 5
Railroad tracks must be kept in A-1 condition at all times. The repairs, replacements and general maintenance should be expensed in all cases. In some cases depreciation charged at the same rate as the buildings they serve would be entirely justified		

All of the above items are subject to the elements and this factor should be considered. All renewals, repairs, replacements, moving and all other such outlays, should be charged to expense at once.

Buildings	*Life Yrs.*	*Rate Percent*
Concrete—Reinforced	30	3½
Concrete Block, etc.	20	5
Brick	20	5
Wooden	10	10
Steel Frame—Corrugated Iron Walls, etc.	7 to 8	15
Building Equipment		
Plumbing—The rough usage of plumbing and fixtures in machine shops and the many frequent changes and moves warrants not over a ten-year life	10	10
Electrical Wiring—Due to the numerous changes that are constantly being made a five-year life is considered about normal	5	20
Elevators—Freight and Passenger	10	10
Sprinkler Systems	20	5
Heating & Ventilating—Same Class as Plumbing	10	10
All of these items are subject to many changes, replacements and maintenance charges, and constant moving around to suit new operating conditions. All changes, replacements and improvements should be charged to expense immediately.		
Machinery		
Machine Tools—Large—Heavy	10	10
Small—Light	8	12½
Automatic	6 to 7	15
It is very obvious that the larger and heavier type of machine tools have a longer economic and useful life than the smaller and Automatic machines.		

	Life Yrs.	*Rate Percent*
A shop that has a large number of automatic machines should charge a higher rate for those machines, as the actual wear and tear is much greater and the obsolescence is more acute. The heavier machines are not subject to the same degree of obsolescence as the smaller machines and the automatics. The three distinct classifications are therefore recommended for most machine tool plants. A fourth classification, at a lower rate of 5% or 7½%, might be added to cover the extremely large machines found in a few of the shops making the largest type of equipment. No rate of less than 10% should apply to the general classes of machine tool equipment commonly in use in the majority of plants. The lower rate is the exception rather than the rule.		
Motors, Controllers and Electrical Equipment—Individual line motors, etc.	10	10
Controllers	10	10
Cranes—Electric, overhead traveling cranes, and craneways, hydraulic, steam, etc., and lifting magnets	12 to 15	7½
Hoists—Jib Cranes, hand cranes, electric and chain hoists, derricks, etc.	6 to 8	15
Shop Equipment		
Hangers, Pulleys and shafting (Due to obsolescence)	5	20
Furnaces and Forges	5 to 7	15 to 20
Lockers, Bins and Benches		

	Life Yrs.	*Rate Percent*
Wooden—Charge to Expense.....	0	0
Steel—Of a Stationary Nature—not over	4	10
Shop Office Equipment	4	25
Shop office equipment is subject to unusual rough usage and depreciates very rapidly.		
Blue Printing Machines and Equipment...	10	10
Breast Drills and other electrically or automatically operated hand tools should be charged to expense.		

Small Tools

Taps, reamers, drills, files, saws, chisels, chucks, etc., should be charged to *Expense* immediately as issued to shop.

Dies, Jigs and Fixtures

Should be *expensed* immediately. If advisable to capitalize, they should be charged off over a period not to exceed three years, or spread over a certain number of machines that would be normal to build and ship in the three-year period.

Patterns and Drawings

Should be *expensed* immediately. In cases where it is found advisable to capitalize, they should be spread over not more than a three-year period the same as Dies, Jigs and Fixtures.

Belting

Belting should be charged off to *expense* at once in all cases.

	Life Yrs.	Rate Percent
Power House Equipment		
Boilers, Engines, Generators } Composite rate	10	10
Office Furniture and Fixtures		
Desks, chairs, and other furniture	7 to 10	15
Mechanical Office Equipment—		
Typewriters, adding machines, check writers, printing machines, etc	3	33⅓
Automobiles		
Trucks—Heavy	4	25
Light	3	33⅓
Passenger cars		3% a month
Automatic Signal Systems	7½	15
Hospital Equipment	5 to 7	15 to 20
Restaurant Equipment—Fixed	5 to 7	15 to 20

This classification should include only such items of equipment as are fixed, such as ranges, boilers, tables, refrigerators and the like. Dishes, pots and pans, and other table and kitchen ware should be charged to *expense.*

Second Hand Equipment

Consideration should be given to the depreciation rates that are to be used and applied to Used or Second-Hand equipment that is purchased or traded in and installed in the plant. It is self-evident that such items of equipment will have served a great part of their useful and economic life before they come into your plants. Therefore such items should not be put into a general machinery account and depreciated at the regular rate charged off on new machinery. Rates that in many cases are many times higher than the rate for new machinery should be used. Second-Hand equipment acquired usually does not have a life of more than four or five years at the most and depreciation rates should be set accordingly.